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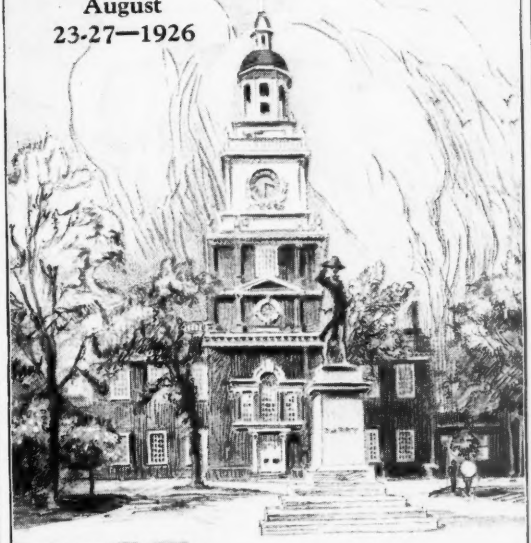

Independence Hall

THIRTY-FIVE CENTS

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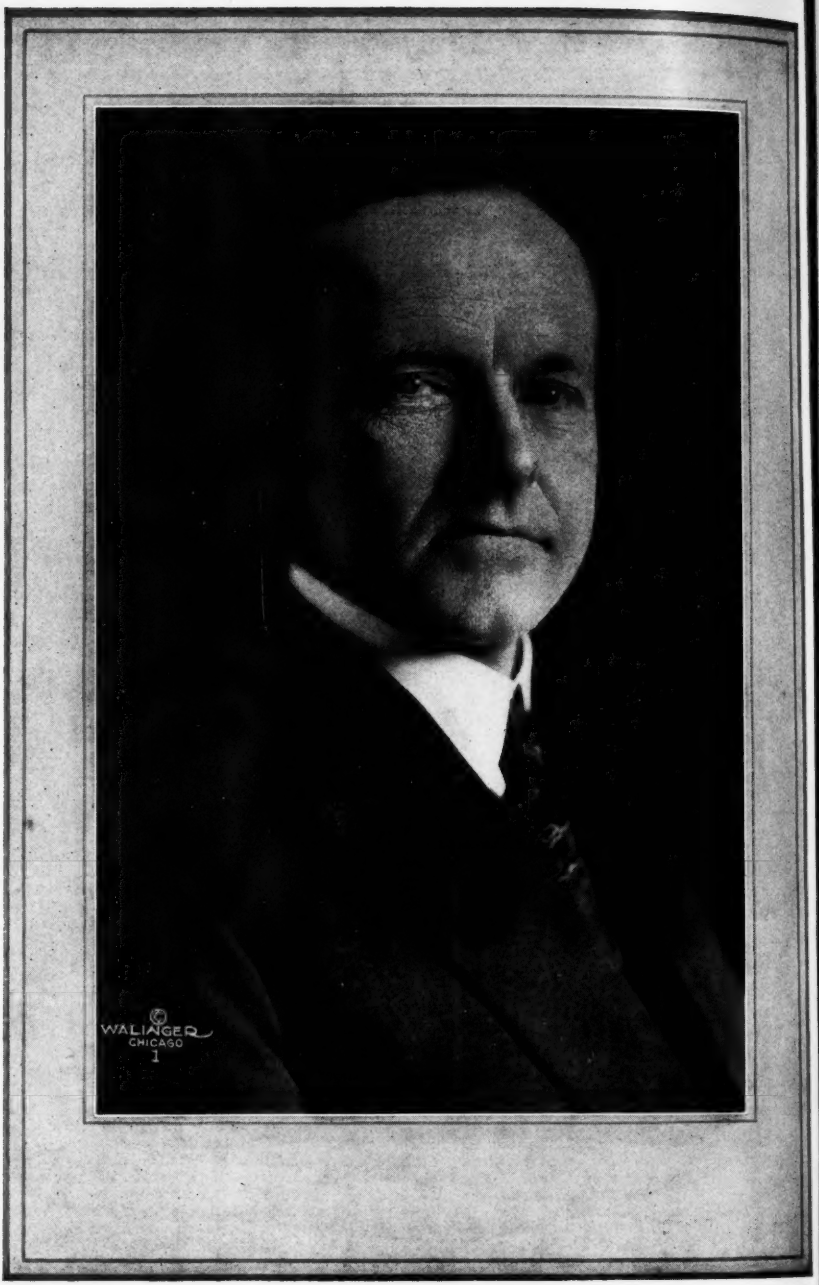

CALVIN COOLIDGE,
President of the United States.

In pursuance of Congressional action, the President has extended invitations to foreign governments to appoint official delegates to the Seventh International Dental Congress, which will thus be held under the patronage of the President. This action of Congress also permits the President to accept an invitation to participate in opening the Seventh International Dental Congress and in giving a reception to its foreign delegates.

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Original Communications

THIRTY YEARS' EXPERIENCE IN THE FIELD OF RADIOGRAPHY*

By C. EDMUND KELLS, D.D.S., New Orleans, Louisiana

IN 1869, or thereabouts, Dr. William Crookes, of England, became interested in the behavior of matter in high vacuums. He constructed the original vacuum tube, known as the "Crookes tube," and, in 1879, the results of his work were made public. Dr. Crookes spent all of his time on his newly discovered "radiant matter" and its behavior within the tube, never once getting a hint of the wonderful effects that were produced outside the tube, because these effects were invisible to the eye.

In December, 1895, Dr. Wilhelm Konrad Roentgen, of Wurzburg, thrilled the world by his discovery of the wonderful rays which he called "x-rays," which had the power to penetrate hitherto impenetrable substances, and best of all, would act on ordinary photographic emulsions in the same manner as do the light rays. It is the fact that the ray can penetrate the tissues of the human body in varying degrees, according to the individual characteristics of the various tissues themselves, that makes it of such immense value to humanity, today.

When Professor Roentgen announced his discovery, there was, in nearly every physical laboratory in the world, one or more of those little insignificant looking Crookes tubes, and means for exciting them as well; that is, either the Ruhmkorff coil, or static machine. As a result of these conditions, physicists the world over were

*Read before the Midwinter Clinic of the Chicago Dental Society, Jan. 27-29, 1926.

immediately in a position to experiment along these lines, and also to give exhibitions of this wonderful ray. They required no preparation whatsoever.

Prof. Brown Ayres, dean of the scientific department of Tulane University, became interested at once in the great discovery and, soon after Professor Roentgen's announcement, gave a lecture and demonstration that was open to the public. I was present, and when I saw him take a picture of a hand (twenty minutes was required for the exposure), I at once became intensely interested. If the bones of the hand could be shown on the photographic plate, why could not the roots of the teeth also be shown? It looked interesting.

On stating my desire to experiment in this line, I was advised by Professor Ayres to obtain a Tesla coil, which I ordered at once.

The results obtained in all of the physical laboratories created quite a sensation, and as it was immediately recognized that the ray could be used for surgical purposes, manufacturers began at once to endeavor to improve the coils. At the same time, the manufacturers of the Crookes tubes took up the work of improving the form of the tube, so that, during the next few months, new model followed new model almost overnight.

In due time, my Tesla coil and tubes came. These tubes were very different in form from the original Crookes tube; they were what were called "single focus" tubes. If it took Professor Ayres twenty minutes to obtain a picture of the bones of the hand, there is no telling how long it would have taken to get the picture of a tooth with his coil and tube. It probably would have taken a week.

I discovered at once that my experimental patient could not, without moving, hold a film in place for the length of time necessary to get a picture, so I was compelled to originate a film holder that would overcome this difficulty. The important feature of such a holder must be that the patient could swallow without moving the film, and that meant that the holder must have occlusal surfaces into which the upper and lower teeth could be closed, because, with the teeth in such occlusion, one can swallow without any perceptible movement.

My first plan was to take an impression for my experimental patient, and make a vulcanite plate with a pocket in it. The side of the pocket next to the tooth to be radiographed was of thin aluminum plate, because the transparency (radiolucency it is called today) of aluminum had been discovered. A piece of kodak film, or rather several pieces of kodak film, were cut of the proper size, superimposed on each other, wrapped in black paper that came with the roll, and again wrapped in gutta-percha tissue, and the packet was tucked into this pocket.

The patient, one of my assistants, was then seated in a chair, with the film holder in position. With the teeth held together and the mouth closed, she could swallow without causing any movement of the film. With the face leaning against a firmly fixed thin board, in order to steady her, the tube was placed on the other side of the board. Thus, I unknowingly used a filter, which possibly prevented my pa-

tient from being burned during the long exposure.

Thus was my first dental radiogram taken. Picture the poor girl sitting there, with her face against the board, for fifteen long minutes.

THE FIRST DENTAL ROENTGEN-RAY CLINIC[1]

You can imagine with what impatience I looked forward to the receipt of the Tesla coil and with what joy I unpacked and set up the machine; and then, my thoughts when the first experimental film was exposed, developed and the finished picture held before my very eyes!

To be able to picture the deeper regions of the jaw so that their hidden conditions could be actually seen was too marvelous for belief; but there were the films, and there was no contradicting their mute attestation to the accomplishment of the impossible.

I was naturally very enthusiastic. Friends, dental, medical and laymen alike, would come to my laboratory to see the wonderful photography of the invisible. My thoughts turned to the approaching meeting of the Southern Dental Association to be held in Asheville in July, and I decided that the subject was of such paramount interest that it would warrant my taking all of the apparatus to Asheville for the purpose of giving a demonstration of the wonderful roentgen ray.

Not only did I take the coil, fluoroscope, tubes, etc., but, appreciating the fact that I could not take a radiogram before the members of the association without a film holder, and that, of course there would be no time to make the holder at the meeting, I also took a subject with the prepared holder, for whom to take the radiogram. In addition I took all of my best radiograms to show what I had accomplished in this new and most interesting field.

Immediately on reaching the hotel, I improvised a dark room in which I could develop the film I was to take; but, after all of these preparations, I was doomed to disappointment, in a measure: I did not get the opportunity to take the picture.

The Battery Park Hotel, where the meeting was held, was supplied with electric current in the evening only. At the time allotted for my clinic, there was also scheduled a society ball in the hotel; but there was no ball on that night. When it was noised about that there was an x-ray machine "going," those attending the ball, as well as others in the hotel, swarmed into our clinic room—there was no stopping them. Everybody wanted to see the bones in her hand. I say *her* hand, because the women predominated.

The current was to be cut off at midnight, and the spectators would not allow me to take a picture and then take the time to develop it. The marvelous fluoroscope was all they wanted to see. I had gone to the expense of bringing a subject all the way from New Orleans and arranging a temporary dark room for the developing of the film, and then did not get a chance to do it. However, we all had a wonderful time and our members and their wives did finally get a "look in" before the current was shut off.

Did I live a thousand years, I could never forget that memorable night, nor, probably, will others who were present.

1. Dent. Cosmos, 38: 1012 (Dec.) 1896.

The members of the association were intensely interested in the possibilities of what would follow the photographing of the invisible roots of teeth and unerupted teeth. Subsequent events have fully justified their interest.

INTERESTING RELICS

It is my great good fortune still to possess one of the original single focus tubes with which these early dental radiograms were made, and also several tubes used during the first few years. I have these safely stored away in fire proof buildings, and I hope to see them displayed some day in a dental museum.

HISTORY AS IT IS RECORDED

Turning to our dental journals for the early records on the subject, which should be interesting, we find that, April 24, 1896, Dr. William J. Morton, a physician, of New York, gave a lecture on the roentgen ray before the New York Odontological Society, where he showed a radiogram of a dried skull. He also showed a radiogram of the head of a man, but he did not show any intra-oral radiograms of this subject, although he showed several intra-oral films taken from dried skulls.

Early Investigators.—Among those who were early to recognize the possibilities of the ray in dentistry were McBriar, Custer, Price, Van Woert, Rollins, Dwight M. Clapp and Dr. C. J. B. Stevens, the last named off in the wilds of Montana.

Crookes Tubes.—The original Crookes tube, as used for roentgen-ray work, carried a single focus, and it was supposed to have a vacuum of the millionth of an atmosphere. The first special tubes made for the Tesla coil also had a single focus, but the pattern was in use for a short time only, when it was replaced by an improved tube, one with a double focus, which not only took better pictures, but also reduced materially the time necessary for the exposures.

One of the original difficulties encountered in roentgen-ray work was the fact that, while in use, the vacuum of the tube would rise until it reached such a point that no roentgen rays would be produced. This rise in the vacuum was due to the fact that, during the excitation of the tube, the few molecules of air remaining in it would be violently bombarded against the walls of the tube and finally would adhere to them. In order to reduce the vacuum, the tube would be heated by means of an alcohol lamp, the heat driving off the air molecules from the walls of the tube, and thus the vacuum would be reduced to the original state.

Believe me, friends, taking a dental radiogram in these early days was a task. To overcome this difficulty, that is, the rise of the vacuum, some bright mind brought out a tube to which was attached, by a short stem, a small auxiliary bulb containing a small quantity of caustic potash. When the vacuum rose to an impossible degree, this small bulb could be heated with the alcohol lamp and some of the potash volatilized, and thus the vacuum would be reduced. This tube was a great improvement over the earlier models. Certain modifications of it were made, one of which surrounded the potash bulb with a fine wire to be heated electrically, but none of them were much of an improvement.

Automatic Regulation.—While, as just seen, the tube with the potash bulb was a great improvement, it had certain

inherent objections. These Queen & Company overcame by making a tube capable of automatic regulation. The potash in the bulb was automatically heated, when necessary, by the current supplying the tube, and the heating would be by fits and starts, as the changes in the vacuum varied. The Queen tube marked the greatest improvement in the progress of the art, and today all tubes offered must have some method of automatically regulating the vacuum or they are not acceptable.

The Water Cooled Tube.—However, if these tubes were excited continually for any length of time, the targets would become red hot, and, at times, would even melt, so the next step was to make a hollow target, carried by a hollow stem containing another tube. Through these two tubes, a continuous stream of cold water could be kept running to the target, and back. One can readily imagine what a nuisance such a tube must have been, and yet I, among others, used them.

Oil and Air Cooled Tubes.—Then followed tubes cooled by oil and others cooled by air, but I had trouble enough without trying any of these.

The Gas Tube.—Tubes containing gases of various kinds were made and tried out, and some operators used these in preference to the vacuum tubes.

Punctures.—One of the greatest drawbacks to these tubes was their liability to puncture. Sometimes, one could use a tube but a few times, sometimes for a few months; but the puncture was sure to come. Well do I remember connecting a $45 tube—$45 was a fortune for a tube in those days—posing my patient and closing the circuit, when—biff! a puncture occurred. I have used one Coolidge tube, day in and day out, for several years without a thought of such a calamity.

The Coolidge Tube.—Then, in time, came the Coolidge tube, which carries the present day operator through his work in blissful ignorance of the handicaps of the earlier men; of their trials and their tribulations; of their failures; and lastly, of their successes; but what a price many of these pioneers paid.

The Coolidge tube is the universal standard of today and has undoubtedly contributed more to the advancement of roentgen-ray science during the last twenty years than has any other development since the discovery of the ray.

Ruhmkorff Coils.—At the time of Roentgen's discovery, the Ruhmkorff coil had certain disadvantages; therefore, Prof. Brown Ayres advised me to get a Tesla coil. In a few years, improvements had been made in the Ruhmkorff coil to such an extent that I discarded my Tesla coil and replaced it with a Ruhmkorff built especially for roentgen-ray work, but whose make of machine this was, I cannot recall at the moment. It was with this coil and the latest pattern of tube that the picture taken in twenty seconds, shown before the National Dental Association in 1903, was made.

Then, in a few years, this coil became obsolete and was replaced by a Queen; the life of which was also only a few years, it giving way to a Scheidel.

The Rotary Converter.—Then the day came when all these coils and their vexatious interrupters were consigned to the junk pile; when all the work of scores of men went for naught—coils

and interrupters were of the past. The rotary converter supplanted them.

The first rotary converter was installed in the Jefferson Hospital of Philadelphia in 1907, and, since then, coils have rapidly disappeared. In due time, my Scheidel was replaced by a Victor Universal, Jr. So, today, it is the rotary converter. What will it be tomorrow? Radio, possibly.

The CDX.—Then the day came when the Victor had served its time and was replaced by the CDX, my present installation. This tube is the marvel of the age. The midget Coolidge tube is enclosed in a small compartment along with the transformer, and the compartment filled with oil. This arrangement does away with the deadly high tension wire, which is very much in evidence with about all other machines of which I know, and which has caused several deaths to dental patients. The CDX machine has now been in use nearly two years and is very satisfactory in all ways.

So much for my experience with the generators of the ray, of which you see, I have had six different installations, in order to keep up with the progress of the times.

Static Machines.—A Crookes tube can be excited by a static machine, and, in the very early days, when the Ruhmkorff coils and their interrupters were working at their worst, some operators used static machines instead. These machines were far from satisfactory, and, when the coils were improved, they were gradually given up, and now-a-days, it probably would not be possible to find any of them in use.

The Setting of the Tube.—It will be readily appreciated that, with the constant changing of the vacuum in the tube of the early days, every time one needed to take a picture the tube had to be "set" for that individual case. This was done originally by means of the fluoroscope, no meters of any kind having yet been devised or, probably, even thought of. The accepted method was to take up the fluoroscope with the right hand, place the left hand before it, start the machine and then have the rheostat moved along until the bones showed clearly. Then the patient would be posed and the picture snapped.

The disasters to the operators which followed these frequent exposures of their hands need not be dwelt on here. It is only necessary to say that nearly every one of the early operators who did much experimental work, paid the price with his life. Only a few of them still live, and they are paying a still higher price, improbable as that may seem.

The Fluoroscope.—As just shown, a fluoroscope was, in those days, an indispensable element in one's equipment. Today, fortunately, they are of no use in dental work.

Penetrometers.—The method of using the hand and a fluoroscope was, of course, most crude and inaccurate, so the next improvement was the use of what was called a penetrometer, which did away with the exposure of the hand. There were several forms of perfectly good penetrometers given us with which the desired vacuum in the tube could be determined and recorded so that it could be duplicated at another time. Penetrometers merely took the place of the hand in front of the fluroscope.

Meters.—Today, penetrometers are things of the past, thanks to our im-

proved machines. The voltage, amperes and milliamperes generated by the machine are recorded on meters, which are read at a glance.

The Interrupter.—In order to operate an induction coil, it is necessary to interrupt the current supplied to it. Originally, these interrupters were magnetic. Magnetic—make and break—interrupters, however, were entirely too slow in their movements, so it was found necessary to devise interrupters with higher speed.

One of the earliest of these was the mercury turbine, and a very ingenious affair it was. While it was a great improvement on the other forms of that day, it certainly did have its drawbacks, or rather, I should say, it was a perfect nuisance.

Then came the Wehnelt, which was wonderful in its action, and just as simple as it was wonderful, and yet even it was a source of worry. With these forms of interrupters, the time necessary for an exposure was again cut down, and again better pictures were obtained.

Then, as I said before, the time came when these troublesome interrupters were rendered unnecessary, and right gladly did we all see them take their departures from our laboratories and give place to our rotaries.

The Emulsion.—In the beginning, stock photographic plates and kodak films were used by all roentgen-ray operators, and while the roentgen ray acted on this emulsion to a certain extent, it was at once recognized that possibly a different character of emulsion might produce better results with the ray. Carbutt, a manufacturer of photographic plates, bent all of his energies on this subject for some time, and, as a result, produced a plate much more suitable for this class of work.

Finding these roentgen-ray plates gave so much better results than could be obtained with the ordinary kodak film, which I was using, I would, at times, cut a glass roentgen-ray plate into small pieces, and use them. With these little glass plates, better results were undoubtedly obtained, but imagine cutting up glass plates and using them within the mouth. Fortunately, I preserved one of these plates, and I have it yet as a curiosity.

Other manufacturers followed Carbutt's lead, and great improvements were made in the emulsion.

Triple-Coated Films.—Dr. Weston A. Price took up roentgen-ray work quite early in the day. He suggested to a manufacturer that a film with three coats of emulsion be made for dental work, and the firm complied with his request. These Seed's triple-coated films were quite an improvement, and I for one used them for many years.

Black Rubber.—The wrapping of the film, first, in a black paper and then in a waterproof covering, made a rather unhandy packet, its sharp corners being objectionable. When Price suggested ordinary black dental rubber for the envelop, I adopted it at once, and it certainly was a wonderful improvement.

The Dental Film Packet.—In 1909 came the original dental film packet, produced by the Eastman Company. The films were first wrapped in black paper, and then again in a red waterproof paper. This made what was, to my mind, a very undesirable packet, and I never did use the smaller size. The

larger sizes are not so bad, and I use them even today when a larger film than the standard size is needed.

The Buck Film.—This rubber envelop made an exceptionally flexible and agreeable packet to the patient, and I used these home-made rubber covered packets and Price's triple coated films until the advent of the Buck film. Then I changed to this ready-made film packet, and I was glad to be able to get rid of the troublesome preparation of our own films. The emulsion on these films was also a great improvement on that used on the Seed's triple coated film. In this connection, it should be noted that a patented rubber covered dental film packet was placed on the market not long ago.

The "Just-Rite" Packet.—Again, within the last year or two, a very simple film packet (the "Just Rite") has been marketed by George W. Brady & Company. This is paper covered and quite flexible. I use it quite extensively.

Duplitized Films.—The next improvement in films was what is known as the duplitized film, which was produced in 1918. This was furnished only in 5 by 7 and larger sizes. These films are very rapid and very fine as well, so that some operators, Dr. Frederick F. Molt for one, cut and wrap them for dental use. Personally, I do not find that the results obtained really justify the time spent in this work. We are living in strenuous times. Nearly every one of us has two seconds of work for every available second of the day. Were better results obtained, I would cut and wrap the duplitized film just as I cut and wrapped the triple-coated films for twenty years and more, but as better results are not obtained, I do not do it, and so, as a rule, I use the film packet already described. For extra-oral work, I use the duplitized films exclusively.

Bite Wing Packets.—Recently, Dr. Howard R. Raper brought out a new style of film packet—the "bite wing packet," it is called—for which he has great expectations. It is designed principally for the purpose of detecting cavities in the teeth, but I believe that if an operator cannot find cavities on the crowns of teeth, without the use of the ray, what he needs is a competent dental assistant to make his examinations for him and not a roentgen-ray machine.

The Radiatized Film.—The Eastman Company is about ready to market a new film, the "radiatized." The company was kind enough to send me some advanced samples, which I find have some very superior qualities.

Development of the Film.—The first difficulty of exposing the film in the patient's mouth having been met, the next problem was its developing.

The Developing Solution.—While, in the beginning, the development of a good sized glass photographic plate which has been exposed to the ray required quite a long time, it did not present any very great difficulties because the coming out of the image on the plate could be seen quite satisfactorily. Not so with my miserable little kodak films. In the first place, they were very small, and, having been cut from a kodak roll, they would not lie flat, but curled up in a most tantalizing way.

Then again, the image was always so faint upon the wet film that it was impossible to see it by the ruby lamp. The result was that I was driven to

invent the method of time development. This method was as follows:

Always three or four, and sometimes as many as five, films (the kodak films were very thin) were cut to pattern, superimposed on each other and enclosed as previously described, and exposed.

After exposure, and when ready for development, the packet was opened, in the dark room, of course. The first film was caught in a clip and laid aside. With the second film, one corner was clipped off, and it was caught in a clip and laid by film number one. With the third film, two corners were clipped off; with the fourth, three corners, and with the fifth, all four corners; or, instead of clipping off the corners, they were simply slit.

Then all five films were immersed in the developer. At the end of, say, ten minutes, film number one was removed, rinsed and placed in the fixer; in fifteen minutes, film number two was rinsed and placed in the fixer, and so on, each film being developed a different length of time. A record was kept of the length of time each film was in the developer.

When the films were finished and dried, each could be recognized by the number of corners clipped off or by the slits in it. Thus I developed my early films, and I would get at least one rather satisfactory film out of the lot. You must bear in mind that the process of developing films, at that time, was most crude and unsatisfactory, and consequently many of the early films were flat failures.

In developing plates or films by the tray method, the tray must be continually rocked during the time of the development. You can well imagine how much I enjoyed rocking a tray for from thirty to sixty minutes in a closed dark room, on a summer night. I soon transferred the job to an electric motor, which operated a rocking machine. This, of course, was quite readily devised and built. But shallow trays did not behave so very well in the rocking machine, so next deep vessels were used instead, and thus slopping the solution over the sides of the tray was avoided.

Thus, we see that development by time, and in tanks, both the accepted methods in use today, which were not practiced at that time, were methods that I was absolutely driven to devise, because I couldn't do my dental work very well by the accepted methods of the day.

Titubators.—I did not like to have to rock my trays; the general radiographer did not like it, either. Therefore, in time, rocking machines for the use of the general radiographer were marketed under the name of titubators. Of course, when tank development came into general use, these machines went into the discard.

Developing Agents.—Having decided on a method for developing the film, the next question was that of the formula of the developing solution. "Pyro" was (and, I believe, still is) the favorite with photographers, but it certainly was a difficult one for a dentist to handle, because it stained the fingers badly. Metol and hydrochinon were the favorites with most amateurs at that time, and, therefore, these were generally adopted by all roentgen-ray workers.

During all the years that have elapsed since 1896, there has never been a standard developer adopted by all workers.

Developing Formula.—Eastman uses one formula, Buck another, and sometimes the operator evolves a formula of his own. They are all pretty much

alike, requiring from five to six minutes for the developing of a film.

The Wonder Developer.—The latest thing in this line is the "wonder" developer, as I have called it, for the want of a name of its own. It is a marvelous solution, evolved by a cousin of Dr. Ottolengui's, who has allowed me the privilege of bringing it to the attention of the profession through the pages of the "Johnson Text Book of Operative Dentistry," fourth edition, and the *Dental Items of Interest.*

The time necessary for the complete development of a film with this formula is exactly forty-five seconds, so you can readily see why it appeals to me. Bear in mind that one can expose a packet, develop the one film in the Eastman developer for five minutes and the duplicate in the "wonder" developer for forty-five seconds, and the finished films are practically alike.

Then Dr. Clarence O. Simpson changed this "wonder" formula somewhat and produced one that requires one minute for the development of the film; but I must say that, in my hands, it is not any better than the original formula. It is not so simple, nor does it keep so well, so I still use the original formula. I would advise every roentgen-ray worker to try them both and adopt the one with which he can obtain the best result.

One thing is sure: any dentist whose time is of value, who now uses any five or six minute developer, is behind the times.

Radiol.—The "wonder" developer, which I praise so highly, can now be had in handy packages as it is marketed by the Novocol Chemical Mfg. Co. (Brooklyn), under the name of "Radiol." I make up my own solutions from the raw materials.

The Fixing and Hardening Solutions.—In olden times, a plain "hypo" fixing solution was used, but, in time, some dissatisfied person eliminated the disadvantages of this solution by adding to it other ingredients. The problem of these solutions never was so vexatious as was that of the developer, and today any of the standard acid fixing baths, Eastman's, Buck's or any other, probably, are perfectly satisfactory..

Automatic Washing and Drying Machine.—I devised and built quite an elaborate machine for washing and drying the films automatically. The films were hung in this apparatus and the switch turned on. They were washed for a predetermined length of time, and then automatically dried. This proved more bother than it was worth, and I soon went back to the usual method.

CHANGES IN METHODS

In 1896, it required from five to fifteen minutes for the exposure of the film, and then from thirty to sixty minutes to develop and fix it. Today, I snap a picture in from four to ten seconds (I use slow films), develop it in forty-five seconds, rinse and fix for forty seconds, when it is sufficiently clear to be examined. In other words, in less than two minutes from the time the switch is closed in order to take the picture, I can read the film. This is routine practice—a great change in thirty years.

THE TEMPERATURE OF THE SOLUTIONS

It is a well known fact that only the best results in the making of radiograms can be had by following certain well

known and fixed laws, and one of these laws governs the temperature of the solutions. Sixty-five degrees was fixed on as the correct degree at which films should be developed. This meant that in many climates (ours for one), the solutions must be cooled by ice during a great part of the year. The use of plain ice water baths was most unsatisfactory, as it was impossible to keep the solutions at exactly 65 degrees for any length of time. Many times, they were used in haste, when they were either too cold or too warm.

This problem of temperature was a most annoying one, but finally it was solved by the devising of a "constant temperature bath." With this apparatus, our solutions are maintained constantly at a temperature ranging from 65 to 65.5 degrees. It is a constant joy.

THE DRYING OF FILMS

Originally, our films were hung on wires and dried very slowly. Next, they were hung in front of an electric fan and were dried quickly. But an electric fan stirs up dust, and dust would collect on the films, and that was bad. Now my films are hung in a little drying box; the door is closed and filtered compressed air driven through the box. Thus, they are quickly dried and are kept free from dust.

IDENTIFYING FILMS

Many schemes for the identification of the finished film have been tried, but, as far as I am concerned, none were satisfactory until I hit on the very simple plan of giving each patient a case number and writing the number on the film with pen and ink.

THE DARK ROOM LIGHT

Originally, the ruby lamp, as it was called, was the accepted light for the dark room, but unless this red light was very faint indeed, it fogged the film. In time, the Wratten Safe Light, Series No. Four (Eastman Company), was given us. This is a soft green light about 100 times more comfortable to work by than the ruby lamp. It can be strong enough to read by, and yet it will not fog the film.

FILM HOLDER

After making a few of the vulcanized film holders described in the opening pages, the absurdity of its tedious process dawned on me; whereupon, I made a holder with a modeling compound articulating surface and an aluminum plate, which could be made up in a few minutes, and was just as satisfactory as the vulcanized rubber holder.

The time soon came when exposures were so short that, as a rule, no film holder was necessary, the patient generally being able to hold the film in a satisfactory manner. However, for lower molars and bicuspids, I have never given up the film holder. To this day I use, for those regions, a very simple film holder of my own design. There are a number of film holders on the market, but none of them appeal to me.

SCREENS

The value of screens was learned in the early days, and they are universally used today for all surgical work. While it is possible to use these with intra-oral films, it is not practical, but for extra-oral work I always use them.

ORIENTATION

Whenever our ordinary film is properly exposed, anyone can discover from it the side of the jaw that was radiographed. By properly exposed, I mean with the emulsion side of the film placed against the mucous membrane. The proper locating of a film is called orientation. When duplitized films are used with an emulsion on both sides, they cannot be oriented in this manner, and some method of identifying his films must be devised by each operator.

STABILIZER

The fluctuation in the voltage of the current, as delivered to our offices, was most annoying, to say the least, as, under these circumstances, it was not possible to standardize our exposures. Then came the Victor Kearsley stabilizer, which, as its name indicates, keeps the current supplied to the tube at a stated point, notwithstanding the fluctuations of the current supplied the machine. This was a wonderful improvement, because with it we can standardize our exposures as far as the current used is concerned.

DIAGNOSTIC WIRE

May 10, 1899 (according to my records), I was attempting to fill the root canal of an upper central incisor for a little boy. The tooth had been broken in a fall and the pulp had died. As the end of the root had not been fully formed, and the whole canal appeared to be at least one sixteenth inch in diameter, if not larger, you can well imagine that I had a problem on hand when an attempt was made to fill this canal to the end and no further, which I desired to do.

In those days, I filled large root canals with lead wires and zinc oxychlorid or, in apparently hopeless cases, sometimes a lead wire and chloropercha. It occurred to me to place a lead wire in this root canal and then take a radiogram to see whether it extended to the end of the root or not.

I carried out this inspiration, for an inspiration it surely was, and the result was all that was anticipated. The lead wire was shown very plainly in the root canal, but, unfortunately, this film was spoiled, a fate that befell much of my earlier work.

That, I believe, was the very beginning of the now universal practice of using diagnostic wires in our everyday work.

STEREOGRAMS

When we look at a photograph of any beautiful object, say a statue, or a vase of flowers, we see certain details, but the picture is flat. Viewing the same object stereoptically, we see something very different. Stereoscopic intraoral radiograms, that is, stereograms, are practically invaluable in some instances, but they are not so easily made, and, again, to mount and study them is difficult.

In 1903, again in Asheville, I presented this subject to the American Dental Association, outlining the technic for the taking of stereograms. I also exhibited a number. Occasionally, a case is met in which a stereogram is invaluable; therefore, I insist on the importance of the work.

NOMENCLATURE

While Professor Roentgen gave to his newly discovered ray the name "x-ray," thereby showing his modesty, an appreciative people rechristened it,

later on, the "roentgen ray." The pictures themselves had to have a name, which he did not suggest, so various operators suggested terms. Skiagraph, skiagram, radiograph, radiogram and others were suggested, and, for the first few years, skiagraph was the term generally accepted.

Skiagraph is from the Greek. It means shadow picture, and as these pictures are shadow pictures, I called my first one a skiagraph, and have continued to use this term.

Radiogram is the term generally used today by dentists and lay people, and roentgenogram is used by the scientific world. Dr. R. Ottolengui has given us three very useful words:

Radiopaque: Impervious to the x-ray.

Radioparent: Allowing the passage of the x-ray freely.

Radiolucent: Offering some resistance to the passage of the x-ray.

DANGERS

In the early days, the roentgen-ray apparatus afforded a wonderful field for the empiric, and the most extravagant claims were made for it. Facial blemishes, such as birth-marks and moles, could be eradicated, superfluous hair could be removed, and best of all, cancer could be cured.

An intensive campaign of treatment by the ray was inaugurated, mostly by men of no experience and but little ability, and the result was that many patients were burned, some very badly. Operators, too, who repeatedly exposed themselves to the ray were badly burned. Dr. Walter Dodd, of Boston, one of the earliest experimentors in this line, was severely burned before a year had passed, so that the dangers of its use soon became manifest.

Filters.—It was an early discovery that there were several kinds of rays which came from the tube and that certain rays were those that caused the burns. By placing a filter between the patient and the tube, these harmful rays are absorbed to a certain extent and prevented from reaching the patient. Occasionally, medical patients are still burned.

Aluminum is the generally accepted material for filters, though many other materials will answer, and that is why I said, in the beginning, that the wooden filter, which I accidentally used when I took my early pictures, probably saved some of my patients from being burned.

Again, another type of trouble developed. Those who repeatedly exposed their hands for a few seconds at a time only, as, for instance, when setting the tube, did not manifest any bad results for a time, but, later on, possibly five years, possibly ten, did develop trouble of a most serious nature. Some developed keratosis only, which was not severe; others lost one or more fingers, and still others paid the price.

Opaque Shields.—In order to lessen the dangers to the operators themselves, an opaque rubber shield was devised. This enveloped the tube and no rays could penetrate it. A small window opposite the anode allowed the rays to reach the patient. Dr. Weston A. Price suggested the use of gloves made of the same material, for the protection of the hands. I used both the shield and the gloves for quite a while.

This rubber envelop had its disadvantages, and so it was superseded by a lead glass bowl, which was much better in every way.

The next step was to make the tube

of lead glass, all except a plain glass window opposite the target, through which the rays passed freely.

Sterility.—It was noted, early in the employment of the roentgen ray that the operators were, as a rule, childless, their sterility having been caused by exposure to the ray. For reasons quite apparent, little is known of, or rather should I say, written about, this feature of the ray.

Chemical Poisoning.—Again, still another kind of trouble developed, and while it was not due directly to the influence of the ray, as it was the indirect result of its use, it should be recorded here. Dermatitis on the hands may result from the use of certain chemicals to be found in the dark room. I, myself, used solution of formaldehyd in a 5 per cent dilution in the summer, as a hardener. Again, some persons are readily poisoned by metol, one of the common developing agents. So, in any case of trouble with the hands, the dark room chemicals should be well considered before the damage is charged to the ray itself.

As already stated, it is readily possible to burn a patient by an exposure to the ray, and so every dental operator must be on his guard. I once took two radiograms of a lower molar for a patient, and the result of this short exposure was a slight redness of quite an area about her face and neck. Fortunately, this disappeared as rapidly as it came. On four separate occasions, ordinary exposure of the upper teeth were followed by the loss of hair from a small region of the scalp. These cases did not prove serious because new hair grew, but they were not pleasant experiences for me at the time.

These cases have amply proved to me that some people are so susceptible to the ray that just the usual exposure for one or two films will produce very unpleasant results. However, it should be noted that all of these troubles occurred during the time that I used coils. Not the slightest trouble has been met with since the rotary was installed.

Accidents.—When operating a roentengen-ray machine with the high tension wire running to the tube, and consequently exposed, one must never forget that such a wire is carrying a death-dealing current and that there have been one or more patients killed while having dental radiograms taken. Again, one must not forget that if any one comes within a certain distance of the wire, the current may jump over to the person and give a severe shock. These are things never to be forgotten for one moment by any roentgen-ray operator.

As already stated, in the CDX machine, the transformer and the tube are immersed in the little box of oil; consequently, there is no high-tension wire anywhere in sight. The very fact that it would be practically impossible for a patient to come in contact with a high-tension current caused me to give up my Universal, Jr., and 7-inch Coolidge tube for this machine. I use this machine with a feeling of perfect comfort and that is more than I could say of any of the others.

EARLY OPPOSITION

Early users and advocates of the use of the ray met with considerable opposition, and this came from the very quarters where we should least have expected it. Many of the best men in

the profession opposed its use and openly condemned it.

In June, 1897[2] Dr. John S. Marshall, of Chicago, said to the members of the Section on Stomatology of the American Medical Association that he "had intended to use the rays in his practice, but had been deterred by the danger in some cases." On the same occasion, Dr. A. E. Baldwin,[3] also of this great city, is reported to have said: "Our knowledge of the dangers of the x-ray at present is so uncertain that it would be well to be careful in experimenting." He had examined his hand through a fluoroscope a short time ago and for several days there was an uncomfortable feeling in the hand, though it had been exposed to the rays only a few seconds.

Then came Dr. Cryer,[4] who said, in 1903: "Today, if I had a case of impacted tooth, I would depend upon a good sharp excavator rather than upon the x-ray."

Again, as late as December, 1905, or after just ten years of the use and study of the ray, it was my pleasure to read a paper on the value of the ray in our work before the Chicago Odontographic Society.[5] In its discussion, one of your leading men did not believe that roentgen-ray workers could show that bone was regenerated in the apical area.

In 1905, another of your most competent men of today said, in this city: "While the x-ray is useful and valuable in diagnosing cases of impaction of third molars, or impacted teeth wherever they may be, or non-eruptive teeth, and while we can locate metallic substances within the tooth structure, I do not believe it is as valuable in locating an abscess about the roots of teeth, as some of the x-ray men would lead us to believe."

But just as truth will prevail, so will new ideas, if good, and those of us who used to get rather discouraged at times, have lived to see the ray recognized as one of the greatest sources of benefit to humanity. And bear in mind that the science is but thirty years old and consequently only in its infancy.

EXTRA-ORAL PICTURES

There is no doubt in the world that many an operator has, once in a long time, missed something which he should have gotten, by failing to take a skull picture. Again, there comes a case, now and then, in which the desirability of a skull picture is appreciated at the moment. Today, skull pictures are, practically, not taken at all by dentists. Radiodontists and hospital radiologists take skull pictures, and that is about all, as far as I can learn. Skull pictures are usually taken on 8 by 10 plates, a size that it is beyond the ordinary dentist's ability to handle.

Looking at a skull picture taken on an 8 by 10 plate, we see that 80 square inches of plate are involved and that the region of the jaw that is of any value whatever probably does not cover more than 9 square inches. All that portion of the picture immediately around the 9 inch area is so distorted as to be of no value; while, of course,

2. Marshall, J. S.: Disc., Dent. Cosmos, 39: 644 (Aug.) 1897.

3. Baldwin, A. E.: Disc., Dent. Cosmos, 39: 646 (Aug.) 1897.

4. Cryer: Internat. Dent. J., 24 (April) 1903.

5. Kells, C. E.: Dent. Rev. 20: 352 (April) 1906.

all the remainder of what is shown on the plate is of no value whatever.

In the early days I used to go through the agony of using 8 by 10 plates; then 5 by 7; then 4 by 5, and today I have my own home-made cassette which, while holding round films only 3½ inches in diameter, covers the region that I need. These small films are developed as easily as our small packets and so cause no break in our regular routine work. The discovery of the roentgen ray is in the same class with the discoveries of Jenner and Pasteur. It has revolutionized the practice of general and oral surgery, and, in many respects, the practice of medicine as well. It is one of the greatest boons that has been bestowed on the human race, and, if used with discretion, is perfectly safe.

Today, with our modern machines and our knowledge as to how to guard against its dangers, no ill-effects can befall any operator who uses his machine properly.

THE NEW ORLEANS X-RAY LABORATORY

Although radiograms were taken at both of our leading hospitals, and by some physicians as well, several of our leading surgeons were continually sending me some of their difficult cases when they did not succeed in having satisfactory pictures taken. Therefore, in March, 1903, I established the New Orleans X-Ray Laboratory in rooms in the same building with my office and two floors below it. This, however, did not prove at all satisfactory, because cases were naturally sent to the laboratory at all hours; which interfered with my dental practice. Before this I took pictures only by appointment. In a little while, I decided that, as the work of the laboratory really did interfere with my own, I would close it.

The announcement of this institution carried several illustrations: a head of a living subject, with a bullet in it; a foot with a needle; a hip; and also a lower molar with a diagnostic wire in it—undoubtedly the first illustration of its kind ever published.

BOOKS

I have been told by a supposedly good authority that the very first book on dental radiology was published in Austria, but I have not been able to verify the statement as yet. The books on which we, in this country, have depended are those of McCoy, Raper, Satterlee and Thoma. There are two books on the subject now in the making, one by Clarence O. Simpson, the other by Pollia, to which we may all look forward with pleasant anticipation.

PERSONAL CONTRIBUTIONS

My contributions to the literature on this subject may be found in several issues of the *Dental Cosmos* and *Dental Items of Interest*. To Monell's "A Pictorial System of Instruction," I contributed the chapter on "Dental Skiagraphy," and to the Johnson Text Book of Operative Dentistry, third and fourth editions, I contributed the chapter on "The Application of the Roentgen Ray to Dentistry."

A MIRACLE OF 1926

Here I have an announcement to make of what appears to me to be something of more than passing interest. In my hand I hold a dental radiogram which was transmitted from New

York to me here, in Chicago by wire. (Fig. 1.) The originals (Fig. 2) were placed in the machine in New York; the mechanism was started, and in it and the American Telephone & Telegraph Company, which was only too glad to be a party to the transaction.

I did not know that it was possible

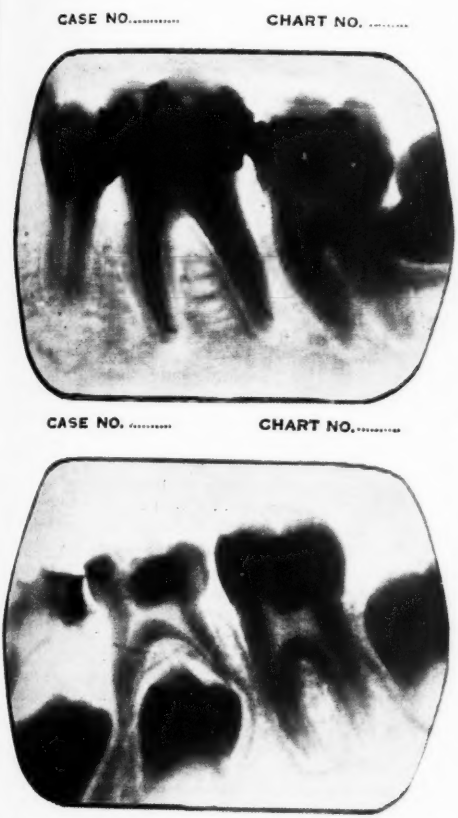

Fig. 1.—Telephotographs of films shown in Figure 2, as received in Chicago. It will be noted that the films are somewhat enlarged; also that the originals are negatives, the telephotographs positives.

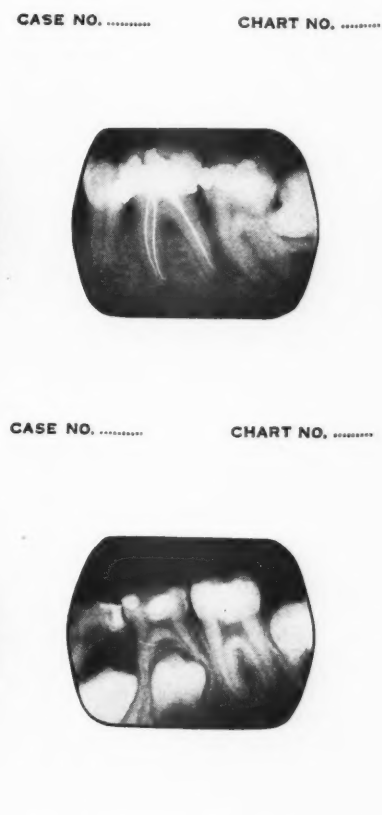

Fig. 2.—Original films employed in sending a radiogram from New York to Chicago.

seven minutes and twenty seconds, the finished replica (Fig. 1) was taken out at the receiving end.

This demonstration was conceived by the Victor Company and carried out by to transmit a film by wire, and I, for one, feel grateful to the Victor Company for what appears to me to be a most wonderful demonstration.

Let me quote from one of the lec-

tures published by the Publicity Bureau of the General Electric Company:

Work with x-rays is still in its infancy and many in this audience will live to see the time when the rays will be found useful in ways yet undreamed of. And with each new practical appliance let us remember that it would all have been impossible except for the patient work of men working in pure science, seeking knowledge for the sake of knowledge, without any idea of immediate personal gain.

DISCUSSION

Hollis E. Potter, Chicago, Ill.: You have just been privileged to listen to a pioneer in the field of the roentgen ray, one who has followed this line during the entire thirty years since its discovery. During my own twenty odd years at active roentgen-ray work, I have been personally acquainted with most of the well known workers in this field and I will say that I can recall the name of no other man beginning dental radiography very soon after Roentgen's announcement who has also continued at the work up to the present time. As a step-by-step recital of the stages by which we have arrived at our present day technic this paper will go down in the archives as a classic. If Dr. Kells should so elect he has a most wonderful opportunity to present to you in a future paper the historical facts relating to the diagnostic or clinical side of radiology. Many of us can look back one decade on dental roentgen-ray work, a few of us can look back two decades, but Dr. Kells can look back the whole thirty years. I believe that he would tell us that twenty years ago the total number of roentgen-ray films used in a month was less than the number now used during a period of one minute in any working day. He would tell you that twenty years ago all knowledge concerning the value of roentgen-ray studies resided in the minds of a very few men who had made the subject a hobby or who were fortunately situated as professors in a dental college. The first ten years were pioneer days for dental radiography but they furnished the basis for all our fundamental knowledge of the subject. During the second ten years, this knowledge was rapidly appreciated by the progressive doctors of dentistry and became a subject for teaching students in all the leading dental colleges. Even during this period, however, there were relatively few dentists who used roentgen-rays in their daily work. It remained, therefore, till the present decade for the rays to be thoroughly incorporated into the practice of dentistry. I believe Dr. Kells will agree that few fundamental truths have been brought to light in the last ten years, but that this period will be known as the time when the fundamentals were widely disseminated about the country and became an ordinary procedure rather than an extraordinary one. Perhaps no one here can strike back into history when, during the first ten years, the facts if not the significance of peridental infections received such valuable contributions through roentgen-ray studies. He can tell you at what date a real alveolar abscess was nearly as large as a pea. Now look where the pendulum has swung. A few years ago, the infection which we considered of possible significance in systemic disease got smaller and smaller, until now there is a school that would disregard all negative clinical and roentgen-ray evidence of disease and condemn the pulpless tooth simply because it is pulpless. This, of course, is an extreme position, because it is obvious that the tendency toward wholesale extraction of teeth can go no farther than this without including teeth with vital pulps, and this I think the public will scarcely stand. This is an extreme position because relatively few patients get over rheumatism after removal of even badly infected teeth, and quite as many are improved after proper handling of the tonsils, the prostate or other parts of the system which commonly harbor infection. From a clinical standpoint, the wholesale removal of pulpless teeth appears to be a needless sacrifice when so many patients respond a year later to a simple regulation of some large bowel disorder. The school which would remove all pulpless teeth inspires in me a growing respect for the few stalwart souls who would never admit for a single moment that a little infection around a tooth had anything to do with general health and disease. Dr. Kells can be justly proud of having made fundamental and early contributions to the science which has revolutionized dental practice from a point where elaborate crowns and bridges were built upon a rotten foundation to the point where practically all visible work is done on solid rock.

Alonzo C. Tenney, Chicago, Ill.: This exhaustive and instructive paper presented by Dr. Kells should be an inspiration to the beginner and a comfort to those of us who look

back over the rocky road of aspiration and disappointment, discovery and death, victory and defeat which has marked the last three decades. We have hoped overmuch but have nevertheless risen to a very much higher level of knowledge and efficiency than we had any reasonable right to anticipate. For any who may have grown weary or who seek new inspiration, a visit to Dr. Kells and his laboratory, the exhibition by him of his devices and his personal enthusiasm will act as a tonic, and a renewal of aspiration must follow. To attempt to discuss Dr. Kells' paper as an historical document would be futile, for Dr. Kells has simply stated facts and events in the order of their occurrence, adding the personal touch of first hand experience. But perhaps I may add a few personal observations along the same line and call your attention to some of the advances made in related or parallel lines in radiography and medicine during this period. These events came to mind readily, for I began the practice of medicine the year (1895) in which Roentgen announced the discovery of "x-rays." Well do I remember the skepticism with which the medical men of my acquaintance received the announcement. But in 1897 I was the proud possessor of a complete outfit for medical work, including the hand fluoroscope. The current to excite the tube was derived from a static machine of sixteen revolving plates operated by a hand crank. With this equipment and plenty of "elbow grease," I secured films of extremities, broken jaws, a few teeth taken on glass plates wrapped in black paper, and two films of coccygeal fractures, secured by placing a fragment of a glass photographic plate inside the rectum of the patient, protected, of course, by black paper, cotton and rubber. Today, with modern equipment, I wonder at the success of the past. Parallel with this development have been the following discoveries: 1. The application of the discovery of the pathogenic germs of tuberculosis and cholera by Robert Koch to the prevention and treatment of those diseases. 2. The development of, and later, perfection and refinement of diphtheria antitoxin. 3. The development or perfection (or both) of antimeningococcus serum, antitetanic serum, antistreptococcic serum and the cure for rabies, the various vaccines for prevention and treatment of the more common infections and, more recently, a large number of specific tests for susceptibility and immunity. Among these the most notable are the Schick test for diphtheria; and the Dick test for scarlet fever, and its wonderfully successful serum treatment by the Dick serum, immunologic knowledge generally and recognition of carriers, etc. 4. The sanitary advances in pasteurization of milk and the treatment of water by any of several methods, which has reduced the morbidity and mortality of gastric intestinal diseases to an unthought of minimum. 5. In surgery, the perfection of aseptic methods as against the old antiseptic ideas. The development of regional anesthesia with its myriad applications, among the chief of which is its application in dentistry, thereby enhancing the practical value of radiography. 6. The development of dentistry as a great and distinct branch of, or rather a specialty in, medicine and the mutual recognition of the need of "team work" between dentist and physician in the solution of many problems of personal and public physical welfare. 7. In the world of science generally and in applied utilities, the airplane, wireless and submarine.

URGENT TREATMENT OF FACE AND JAW INJURIES*

By V. H. KAZANJIAN, C.M.G., D.M.D., M.D., Boston, Massachusetts

IN this paper, the immediate treatment of face injuries will be discussed, with particular emphasis on the treatment of fractured jaws, since this part of the subject is of more special interest to the oral surgeon and dentist.

At the present time, automobiles are responsible for the greatest number of face and jaw injuries, with industrial accidents, falls, fist fights, etc., following in the order given. The latter cases are fewer and, usually, less severe.

NATURE OF INJURIES

Injuries to the Soft Tissues of the Face.—Injuries to the soft tissues of the face may be mild, consisting only of minor cuts and contusions, or, more often, lacerations of some part of the face. With the exception of injuries caused by burns or gun-shot wounds, loss of tissue is rarely seen, even in extensive lacerations, unless following infection.

Injuries to the eyelids, the alae of the nose, and the lips, owing to their normally loose and unsupported condition, may cause varying degrees of deformity if not immediately and carefully treated. Inflammation, edema and ecchymosis set in early, and an appreciable number of patients suffer deep or superficial cellulitis. Prolonged suppuration is rare, but the persistent presence of pus in a face wound is usually indicative of injury to the bone beneath the face tissue or of the presence of a concealed foreign body.

Face wounds seldom cause serious constitutional reaction if adequate measures are early undertaken. The possibility of the development of erysipelas, even under the most favorable conditions, is, however, always present. An otherwise unaccountable sudden rise of temperature, preceding the eruption, is a first symptom. The physician should keep this possible complication in mind.

Injuries to the Facial Bones.—Unfortunately, in most accidents, the bony structure, as well as the soft tissues of the face, is involved. We may find fractures involving the nasal, malar, maxillary or mandibular bones. We seldom find a fracture of only one of these bones, the bone fractures generally being multiple, compound or comminuted. Occasionally, the entire facial substructure is so distorted that a permanent change of the facial outline results. The following case will illustrate this condition.

A young woman, while in Paris, was struck by an automobile and thrown face downward on the pavement, and according to her own belief, a wheel of the machine passed over her head. At a local hospital, where she was taken, in a very serious condition, she received skillful and immediate treatment. Six weeks later, she came to me in America. On examination, at that late date, one could detect the following injuries: both lips were lacerated, both malar bones were depressed and the zygomatic arches were

*Read before the Section on Oral Surgery, Exodontia and Anesthesia at the Sixty-seventh Annual Session of the American Dental Association, Louisville, Ky., Sept. 23, 1925.

pushed out to a greater prominence; the nose was flattened and distorted, the maxilla was still loose and pushed backward and downward and the mandible was fractured in two places. This accident resulted in changing a rather long oval face to a flat round one which was hardly recognizable by the patient's father. This case necessitated long and tedious treatment.

TYPES OF FRACTURE

Injuries to the Mandible.—A few years ago, most mandibular fractures were caused by fist fights or falls, and were comparatively mild in type. Today, automobile accidents are the chief cause of fractures, which, accordingly, are of a more serious nature. It is not uncommon to see multiple, comminuted fractures with laceration of the oral tissues.

Injuries to the Maxilla.—Injuries to the maxilla, while occurring less frequently than those of the mandible, are usually more extensive. We usually find (1) comminution of a part of the alveolar process, with subsequent destruction of the teeth; (2) horizontal as well as vertical fractures, with pronounced downward and backward displacement; (3) involvement of the maxillary sinuses, with frequent comminution of their outer walls. Since the maxillary bones are in close contact with the nasal, malar and other cranial bones, injuries to the maxilla may extend to the base of the skull.

Injuries to the Nasal Bones.—Fractures of the nasal bones are usually of the following types: (*a*) lateral depression of one nasal bone; (*b*) depression of one nasal bone and the overriding of the other, causing lateral deviation of the nose; (*c*) comminution and depression of the entire nose.

Injuries to the Malar Bones.—Fractures of the malar bones are frequently overlooked because of early inflammatory edema, which conceals the entire outline. In such injuries, the orbital ridge may be pushed inward and downward and the zygomatic arch, outward. Occasionally, the floor of the orbit suffers, a slight downward displacement of the eyeball resulting.

EXAMINATION AND DIAGNOSIS

There is usually, in a clear cut case, no difficulty in recognizing the extent of the injury, but, occasionally, in multiple fractures, unless a thorough examination is made, one may fail to make a complete diagnosis. As a guide in doing so, the following points should be observed:

1. Any abnormality in the contour of the face.
2. External injuries of the face, including ecchymosis, contusions, cuts and lacerations, etc.
3. Deviation of the teeth from the normal occlusion.
4. Unusual mobility between the teeth, and crepitus of the fractured area.
5. Condition of the existing teeth and whether there are any loose, broken or missing.
6. General outline of the ridges (in edentulous cases).
7. Artificial teeth, if any. (It sometimes happens that broken fragments of the teeth or parts of artificial dentures act as secondary projectiles and embed themselves in the oral tissue.)
8. Condition of the soft tissues of the mouth.
9. Unusual mobility or depression on digital examination of nasal, malar and maxillary bones.
10. Extent and type of displacement of the fragments. This is mainly

judged by the derangement of the former occlusion of the teeth.

11. Any other objective and subjective symptoms, especially localized pain on slight pressure, which is most marked at the site of fracture; trismus, dysphagia and the mental condition of the patient.

Radiograms should be taken to verify and complete the diagnosis. This is not mentioned after the list of symptoms to be observed because I do not value the importance and necessity of the roentgen ray, but because I would emphasize the fact that we are often apt to consider the roentgen ray as our sole means of diagnosis, and, in doing so, fail to see, or look for, other signs and symptoms which are obvious. The roentgen ray is not infallible. Indeed, it is not uncommon to suspect fracture of the ramus of the mandible from the nature of the displacement of occlusion, which has been verified only after repeated roentgen-ray examinations. Therefore, we should hold the roentgen ray as one of our valuable diagnostic aids, but not discard other signs and symptoms.

TREATMENT

For the sake of brevity, we shall pass over the general medical care and treatment of face and jaw injuries, and deal more with the surgical and mechanical problems.

Treatment of Injuries to the Soft Tissues of the Face.—To gain quick healing with a minimum amount of scar formation, injuries to the soft parts of the face should receive immediate surgical attention. Lacerations should be carefully sutured, observing the following precautions: 1. The jagged borders of the wound should be excised to create a smooth surface for approximation and suturing. This procedure is not commonly practiced, and, as a result, one frequently sees quite unsightly scars requiring secondary operations. Wounds of the face become septic very quickly, and if uneven surfaces are brought together, though they heal by primary intention, they show varying degrees of inflammatory reaction. The obvious objection to excision is the loss of tissue. This does not interfere with proper approximation, as the tissues of the face are loose and can readily afford the slight loss.

2. In suturing, the borders should approximate accurately, special attention being given to the eyelids, borders of the lips and alae of the nose. 3. No undue tension should be applied to sutures. 4. Sutures should be removed at an early date, in from three to four days. 5. If the tissues are greatly inflamed when first seen, it may be necessary to apply hot fomentations for a few days, and carry out late primary suturing within four or five days. 6. If the case is complicated with comminuted, compound fractures of the bone, consideration must always be given to the establishment of adequate drainage before suturing the parts. Much damage is done by closing infected wounds.

Treatment of Injuries to the Facial Bones.—Immediate immobilization of the fractured bones is one of the most important steps in the treatment, as it will (1) give the affected parts rest; (2) minimize pain; (3) hasten the union of the bones; (4) control sepsis; (5) reduce displacement more easily, and so (6) prevent late deformities, obviating secondary operations.

Treatment of Fractures of the Mandible and Maxilla.—In cases of mild fracture of the mandible, with no lac-

eration of tissue and no comminution, there is no immediate operative indication. The teeth adjacent to the fracture line should be watched closely. The slightest indication of looseness or inflammation is a sufficient warning that these teeth should be removed. Usually, this appears after the first week of the injury. Prolonged retention of teeth in the line of the fracture is mainly responsible for late abscesses, local necrosis and delayed consolidation of the bone.

In comminuted fractures, of either the upper or the lower jaw, it is advisable, as soon as the patient's condition permits, to remove all detached or loose teeth in the line of fracture and the alveolar process, even though the latter is adherent to the soft tissues. By operating at an early date, we are able to hasten the healing process and avoid complications.

In comminuted fractures associated with external injuries, one should always have adequate drainage. In such cases, only partial suturing of the wound is justifiable. When the maxillary sinuses are involved and there is definite evidence of infection, drainage should be established through the canine fossa and intranasal root.

I shall now briefly outline some of the most important mechanical and surgical principles involved in the question of immobilization and the construction of maxillary splints. Immobilization of fragments of the jaw is accomplished by (1) utilizing the existing teeth as points of fixation; (2) utilizing the alveolar ridges and palate for the placing of splints to keep the parts in alinement; (3) direct fixation of bones by wire sutures, and (4) the use of external appliances, with which pressure is exerted, such as caps, headgears or bandages.

Of these methods, direct fixation of bones by wire sutures is applied very rarely, and only when other means have failed. Indications for employment of external splints are also comparatively few. Therefore, for the sake of brevity and in view of the fact that we are considering only immediate treatment, we shall consider only the first two methods.

The next question is the selection of the method of fixation for a certain type of fracture. For a number of years, I have found the following classification of fractures of the mandible useful in the selection of splints. (1) fractures anterior to the last remaining tooth or teeth; (2) fractures posterior to the last remaining tooth or teeth, and (3) multiple fractures, having a combination of these groups.

In the first group, we utilize the teeth on either side of the fracture as points of anchorage for our splints. From the point of retention, it is immaterial whether the fracture is in the molar, cuspid or median region, as the same type of splint can be used in any case.

In the second group, we utilize the teeth available for anchorage on only the one side of the fracture, and, on the other side, the alveolar ridge and the upper jaw. Having this classification in mind, the oral surgeon, with his knowledge of prosthetic dentistry and orthodontia, will have no great difficulty in designing a splint that will fit the case.

As outlined above, it is highly desirable to immobilize the fragments on the first visit to the patient. Fortunately, we have at our disposal simple methods of immobilization to make the patient

comfortable and give relief. Splinting should be done even if it is temporary, leaving the application of a precise and positive splint to a later date. In order to immobilize the teeth at the bedside, and without too much discomfort to the patient, we can select one of the following methods, being governed by the type of the case:

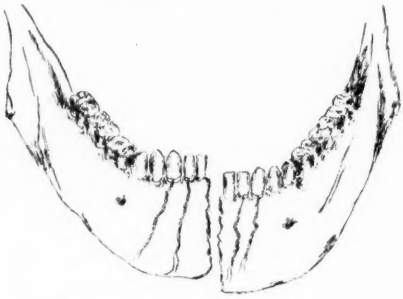

Fig. 1.—Horizontal wires in place.

1. Horizontal wiring (Fig. 1): Angle's fracture wires are firmly twisted about the necks of selected teeth on each side of the fracture. These

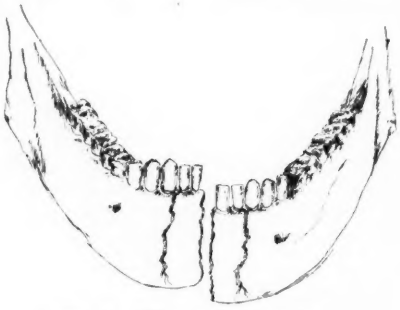

Fig. 2.—Wires paired laterally.

are then brought together and twisted. A cross pull reduces the fracture, and should affect normal occlusion. Usually, two teeth are selected on each side of the fracture. If anterior teeth are utilized, the wires should be paired and brought together by one or two twists, and then joined with the opposite pair.

Fig. 3.—Fracture set by horizontal wires.

Figures 1-5 give modifications and details of splinting.

2. Intermaxillary wiring (Fig. 6): This is probably one of the most universally used methods of splinting. The wires are passed and twisted about the necks of different teeth, and then the upper and lower teeth are fastened together. Bicuspids and molars are wired singly, but incisors and cuspids

Fig. 4.—Horizontal wiring of bicuspids and molars.

should be fastened together in pairs, as in the diagram, and then attached to the corresponding teeth of the opposite

jaw. This method is especially useful for simple fractures, or fractures with little displacement, involving the mandible only. It is not applicable in cases with extensive wounds which require more adequate drainage of the mouth than this treatment affords.

3. Use of wire hooks with elastics (Fig. 7): The brass wires are twisted about the teeth, with the ends cut short and turned over so as to form hooks. Small elastic bands are then passed between these hooks, the fragments of the jaw being thus brought into approximate position. This method is also a valuable aid in reducing displacement as a first step toward immobilization.

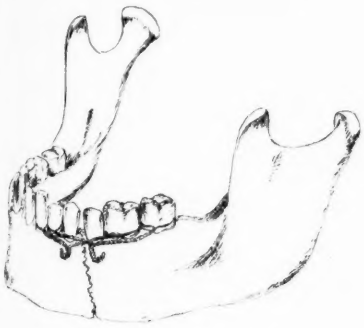

Fig. 5.—Fracture set.

4. Use of Angle's bands, fastened to selected teeth for attachment of temporary wire or silk ligatures: The displacement may be reduced by approximating the fragments laterally, or by anchorage to the upper jaw (Fig. 8).

Having these temporary methods at our disposal, we may introduce a number of modifications and combinations to cope with the existing conditions. In a case of marked displacement of fragments in which horizontal wiring may be ineffective, wire hooks may be added to force the displaced fragments to position by contact traction of elastic bands, or, in some cases, it may be advisable to twist the wires at the lateral aspect of the teeth and then pass them to the buccal aspect between the teeth at the site of fracture, and join them, thus creating a somewhat rotary tension.

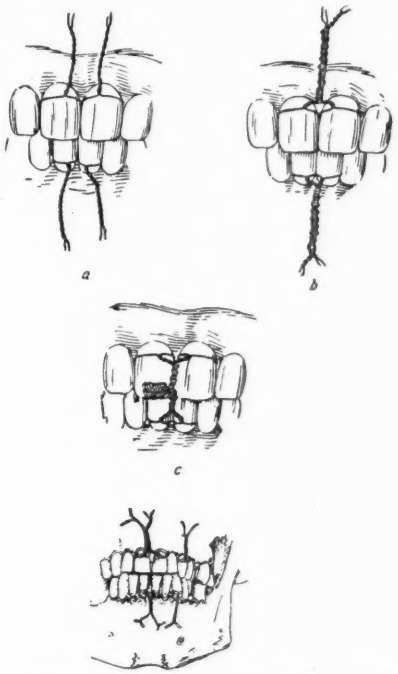

Fig. 6.—Intermaxillary wiring: *a*, single wiring; *b*, wires paired laterally; *c*, immobilization. Below: Similar wiring including bicuspids and molars.

Intermaxillary wiring, while a very useful method, should not be employed indiscriminately, for the following reasons: 1. In a fracture of the first group, we cause the patient unnecessary hardship if we join the mandible to the maxilla. 2. Even in fractures of the second group, in which our main an-

chorage is derived from the upper jaw, there are frequent occasions when we ought to inspect and clean the mouth. Therefore, wire hooks may be more suitable in certain cases, as elastics can be more easily replaced.

We must not wire the lower and upper jaw together in a case of complete fracture of the maxilla, and must avoid wiring the teeth adjacent to the line of fracture, as they are already weakened by the separation of bone.

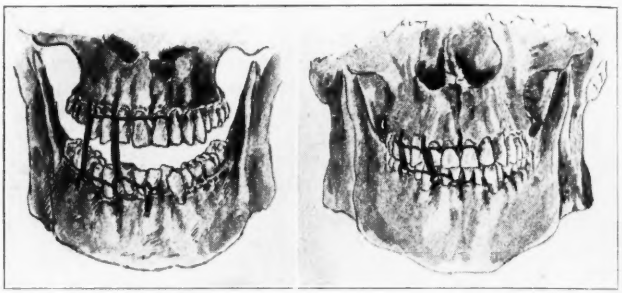

Fig. 7.—Intermaxillary elastics attached to wire hooks (to reduce displacement gradually).

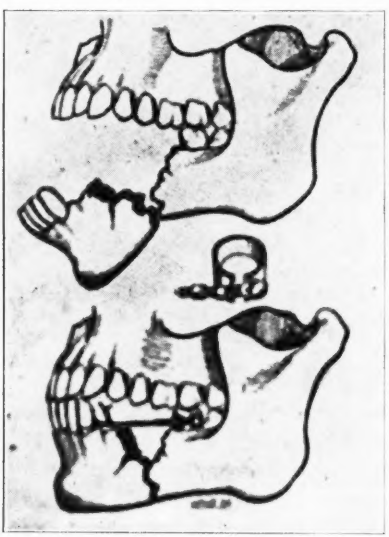

Fig. 8.—Displacement reduced by the use of angle fracture bands.

As I have said before, these are temporary measures, although, at times, wires prove to be sufficiently effective to be left in place until complete union is established. As a general rule, more positive splints should be made as soon as possible, and, for this purpose, impressions of the teeth are taken with

Fig. 9.—Headgear and chin cap (made of surgical webbing and elastic bands) in place.

modeling compound before the wiring is done. Low rimmed section trays are used to take these impressions. It is not necessary to attempt an impression of the entire jaw at one time, it being a more simple procedure to take one section at a time. Casts from these impressions are used in the laboratories as working models, and the final splints are constructed on them.

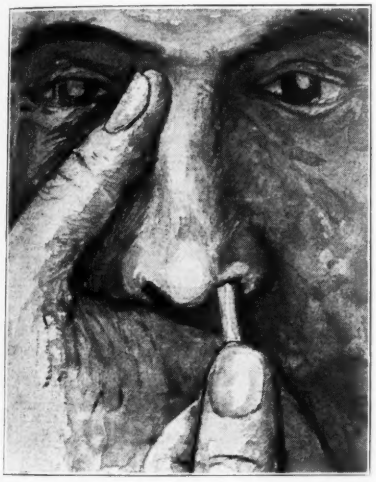

Fig. 10.—Method of reducing simple recent fractures of nasal bones.

Treatment of Injuries to the Maxilla.—Maxillary fractures are most readily reduced by a device which will force the lower jaw against the upper (Fig. 9). For this purpose, a headgear and chin piece made of 1 inch surgical strapping material will prove effective. Both the headgear and the chin piece are provided with hooks on the side of the face near the ear, as seen in the diagram. If there is a considerable backward displacement of the maxilla, in addition to the headgear wire hooks should be attached to the molar region of the upper jaw and cuspid region of the lower jaw to which intermaxillary elastics can be applied.

It is surprising how quickly the most stubborn displacements are reduced by the application of intermaxillary elastics. More complicated fractures of the upper jaw will require the application of Kingsley's splints, attached to the headgear.

Fig. 11.—Nasal splint attached to teeth.

In edentulous cases, the fractures are reduced by utilizing the patient's artificial dentures. The teeth are wired together, and, if there is any discrepancy in the occlusion, it is corrected by adding modeling composition to the maxillary surfaces of the plate. In addition to the use of the artificial dentures, a headgear of strapping should be applied to give counter pressure upon the chin (Fig. 9).

Treatment of Fractures of the Nasal and Malar Bones.—In cases of fracture of the nasal and malar bones, correction should be made as soon as possible. Delay will often cause permanent deformity, owing to the partial fixation of the displaced bones.

Nasal bones can be quickly brought to their proper position. The following is the usual method:

Fig. 12.—Nasal splint attached to teeth (mouth closed).

The patient is anesthetized, preferably with nitrous oxid and oxygen. With a flat instrument introduced under one of the nasal bones (Fig. 10), the bone is pushed upward and outward. In the meantime, with the thumb of the opposite hand, the nasal bones are pushed laterally to normal position. If the tissues are greatly inflamed, it may be advisable to wait three or four days. Meantime, measures should be taken to reduce the inflammation. Usually no support or splinting is necessary. At times, it may be desirable to help retain the bones in position with a splint anchored to the teeth; which is the most positive method yet found.

As the dentist may be asked by his colleague the rhinologist to construct a splint of this type, the following simple splint is suggested (Figs. 11-12).

A suitable tooth, preferably an upper bicuspid or first molar, is selected to serve as an anchorage. A band is constructed to fit the tooth, or a ready made adjustable band, such as Angle's is chosen. To the buccal aspect of the band, two tubes are soldered in parallel position. A fork, consisting of two parallel wires, which fit the tubes accurately, is soldered to the end of a No. 12 wire. The band is then fastened to the tooth, while the wire is bent to protrude from the corner of the mouth to the side of the nose. After the surgical correction of the nasal bones has been made, a piece of modeling composition, held by the upper end of the wire, exerts sufficient pressure on the side of the nose to prevent the parts from sliding back.

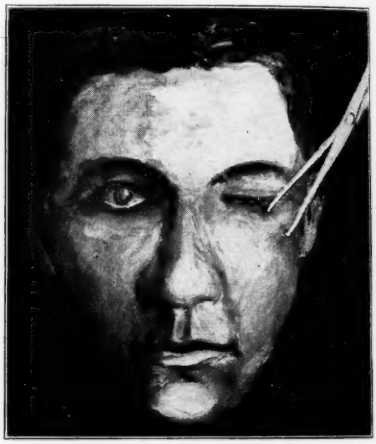

Fig. 13.—Reduction of simple fracture of malar bone.

Treatment of Injuries to the Malar Bones.—Correction of injuries to the malar bones is made either externally or internally through the maxillary sinuses. Externally, the infraorbital ridge is grasped firmly with a hooked instrument in the shape of a cow-horn forcep, and the bone is pulled to its normal position (Fig. 13). If an in-

ternal route is selected, the maxillary sinus is opened through the canine fossa, and, through this opening, the correction of the nose is accomplished. Usually, the cavity is packed for twenty-four hours with petroleum gauze.

CONCLUSION

It has been my intention to adhere as closely as possible to the urgent treatment of face and jaw wounds, and to outline quick and effective methods.

Fig. 14.—Horizontal and intermaxillary wiring.

Unfortunately, there seems to be an ever-increasing need for the application of first aid treatment, and these methods may prove to be of some aid to the medical and dental professions in meeting this urgency.

REPORT OF CASES

CASE 1.—The patient met with an automobile accident, May 27, 1924, and was immediately taken to the hospital, where I saw her three hours later. Local examination revealed the following injuries: laceration of the lower lip, and of the right side of the nose; a deep cut under the chin; tenderness in the right zygomatic region; fracture of the lower jaw between the left central and left lateral teeth with loose segments bleeding freely, and a vertical displacement of 1 inch from the upper teeth. The patient was given morphin soon after admission to the hospital. Operation was performed under local anesthesia, and the lacerations were sutured. In exploring the deep cuts under the chin, I removed several loose fragments of bone. The chin wound was partially sutured with a rubber dam drainage in position. The lower jaw was immediately immobilized by horizontal ligation. In addition, the upper and lower teeth were wired together, as a fracture at the neck of the condyle was suspected. (Fig. 14.) The wires were left in position for over four weeks. After the removal of the adjacent teeth, a band and wire splint was made and cemented over the teeth. This was kept in position another four weeks.

Fig. 15.—Appearance of patient (Case 2) when first seen.

CASE 2.—The patient met with an automobile accident, Aug. 22, 1922, and was taken to a local hospital, where the wounds were sutured. When seen by me, September 26, she had the scars seen in Figure 15. The most marked deformities were: (1) right eye lid drawn down by tension of scar tissue; (2) right corner of mouth distorted; (3) large semicircular scar on the left cheek. October 10, she was operated on and these defects were corrected. (Fig. 16.)

CASE 3.—The patient received injuries in an automobile accident, June 30, 1925. He was taken to the hospital and given first aid

Fig. 16.—Appearance of patient (Case 2) after treatment was complete.

treatment, and the wound on the left cheek was sutured. The case was first seen by me, July 3, 1925. Local examination revealed the following injuries: extensive swelling and ecchymosis of the eyelids and conjunctival hemorrhage of both eyes; left cheek greatly swollen and endurated (Fig. 17, left); maxilla slightly movable but not displaced. The lower jaw was displaced to the left and backward, with a downward displacement of one-half inch. Roentgen-ray examination revealed a fracture of the neck of the left condyle, and of both malar bones, the left being displaced backward. The zygomatic arch was pushed out; and the left antrum was cloudy with the anterior wall comminuted. The left side of the nasal passage was obstructed by inflamed tissue. There was a superficial laceration over the bridge of the nose, but no fracture. Blood was discharged from the left nostril. The general condition of the patient was good. There was a slight rise of temperature and pulse.

July 7, wire hooks were applied to the following teeth: lower left first molar, right upper cuspid and central. To these hooks, intermaxillary elastics were applied. The displacement was reduced in one day, after which the teeth were wired together.

July 10, the patient was anesthetized (ether), the left antrum was opened through the canine fossa and several fragments of comminuted bone removed. The antrum was cleaned and the naso-antral wall, below the lower turbinate, was removed for drainage. The floor of the orbit and infraorbital ridge were pushed to their normal position, and the

Fig. 17.—Left: Appearance of patient (Case 3) when first seen; center: final results of treatment; right: zygomatic reductions.

antrum was packed with petroleum gauze, which was kept in place for two days. A headgear (Fig. 17, right) with an arm extending over the left zygomatic arch was applied to push the arch into position. This arm was attached to the headgear at the frontal region and had elastic bands at the middle part which exerted constant pressure on the zygomatic arch. The headgear was made of black guttapercha and held in position with a strap bandage.

August 25, the patient was discharged (Fig. 17, center).

Fig. 18 (Case 4).—Teeth wired horizontally to reinforce bone wiring.

There was a salivary fistula on the left cheek which continued to discharge saliva from the parotid gland for a long time, but this eventually stopped, without surgical treatment.

CASE 4.—The patient who was thrown from her horse, Aug. 5, 1924, suffered an extensive laceration of the left submaxillary region, with comminuted fracture of the lower jaw. The bare ends of the bone were protruding from the wound. She was immediately operated on by the attending surgeon, the bones being wired together and the wound closed. She was seen by me two days later, at which time she had extensive swelling in the left submaxillary region, and, in spite of the direct wiring of the ends of the bones, there was considerable disturbance of the occlusion. It was necessary to reopen the wound evacuate a large amount of pus and wire the teeth in a horizontal manner (Fig. 18), utilizing the second molar and bicuspid teeth. As the roentgen-ray showed complete alinement, the wires were left in position, but, unfortunately, on reexamination three weeks later, the roentgen-ray showed considerable absorption of bone (Fig. 19). At that time, two teeth and the wires attached to the bones were removed. Meanwhile, there was quite a little suppuration from the original wound.

Fig. 19 (Case 4).—Absorption around bone wiring.

Fig. 20 (Case 4).—Fibrous union.

In spite of this, the absorption continued for a long time. However, it ended with fibrous union (Fig. 20).

Fig. 21 (Case 4).—Bony union. A small piece of wire was later removed.

September 2, the patient was anesthetized, and the ends of the bones were freshened and wired together, leaving the ends of the wires free in the mouth. This operation was done intra-orally. After a long delay, this procedure was successful in bringing about union of the bone. (Fig. 21.)

Fig. 22 (Case 5).—Kingsley splint supported by guttapercha headgear.

To my mind, this delayed union was due (1) to closing the wound, thereby blocking drainage, and (2) to the use of bone wiring for the fixation of bone, and (3) to possible retention of the teeth for too long a period.

CASE 5.—The patient met with an automobile accident, Feb. 5, 1924. She was picked up unconscious, with severe lacerations of the face and forehead, and profuse bleeding from these lacerations and from the nose, and taken to the hospital in a critical condition. At that time, the blood pressure was: systolic 78, diastolic 45; the skin was cold, and the pulse low, ranging between 96 and 100. The patient was thought to be in a condition of shock and was given a shock enema and stimulants and her wounds were cleaned, sutured and drained. After two hours, she began to regain consciousness. During the day, she was nauseated twice, the last time with definitely projectile vomiting. Throughout the day, she bled from the nose and ear. That evening, she was transferred to another hospital.

Fig. 23 (Case 5).—Nasal elevator in position.

Examination on entrance revealed a large

ragged scar over the right orbit down to the upper part of the nose, which has been sutured. The upper part of the nose was driven backward, the mandible was driven backward and distorted, and the upper area of the face was swollen, black and blue. (Hospital record.)

Examination by me, one week later, revealed the following injuries: right eye greatly swollen, with eyesight destroyed; nasal bones comminuted and displaced; large opening over the bridge of the nose leading toward the ethmoidal sinuses and suppurating freely. The upper jaw was very loose and hanging down almost 2 cm. There was also an anterior posterior fracture at the median line separating the two central incisors about 2 mm. The lower jaw showed a fracture at the right cuspid region. Because of the extreme swelling of the face, it was not possible to determine the exact extent of the injury to the malar bones, but roentgen-ray photographs showed the right zygomatic arch to be pushed out from its position.

Mechanical treatment consisted of the immobilization of the lower jaw with metal cap splints; closure of the median gap of the upper jaw with wire sutures about the teeth and wiring of the upper jaw into position with Kingsley's splints, supported by a guttapercha headgear (Fig. 22). A nasal elevator was inserted with elastic tension on the headgear, which raised the upper part of the nasal bone by its tilt (Fig. 23). Later attempts were made to reduce the displacement of the zygomatic arch, but this was only partly successful.

Surgical treatment was as follows: The wound at the bridge of the nose was left open until suppuration disappeared. The right eye was eviscerated by an attending ophthalmologist. Some months later, the deformity of the nose was corrected by a tibial graft to the bridge of the nose; the patient was supplied with an artificial eye (Fig. 24).

Fig. 24 (Case 5).—Appearance of patient (Figs. 22-23) after completion of treatment.

The fracture of the jaw healed with the teeth in good occlusion and the bone graft to the nose was successful. There was, however, some depression of the infraorbital region and abnormal protrusion of the zygomatic arch which, combined with the use of the artificial eye, caused what seemed to be an irreparable damage.

475 Commonwealth Avenue.

DISCUSSION

Henry S. Dunning, New York City: I don't quite agree with Dr. Kazanjian that automobile accidents are now causing most of the mandibular fractures. The five fingers

are causing the accidents in civil practice more than anything else. A great many automobile accidents occur, and those are severe, but the bare fist is the weapon that has been fracturing the mandible, and still does so quite commonly. In 1915, I reported 1,065 fractures of the mandible, fractures in the body of the mandible and ramus; I would say chiefly in the body of the bone, caused by the bare fists, not by brass knuckles. Since prohibition has come in, we have not had quite so many fractures of the mandible. We used to have more than 200 fractures a year. Now there are more injuries from other sources, automobile accidents, elevator accidents and so forth. The lives we are leading in the larger cities are more strenuous and there are more accidents. I also think that there are more gun shot cases than there used to be. In the old days, it was rare to see a gun shot case. But the primary factor in injuries of the mandible is the closed fist. A man came to me the other day who had been working on a 5-story building, standing on a beam. The beam fell, and he fell five stories, landing on his face in the cellar where there were a lot of barrels and cement. He had a severe fracture of the upper jaw. In a few weeks, he had but a few scars, and there was little loss of tissue; there was little to do in the line of plastic repair. The automobile and the elevator and gun shots are the cause of the most loss of tissue. Many of these injuries in civil practice require little plastic repair as there is not much loss of tissue, and it is surprising how well they do with ordinary splinting, immobilization and drainage. I agree with Dr. Kazanjian that it is a great mistake to wire the bone surgically unless it is absolutely necessary. I have done it only a few times in more than 2,500 cases. I think it is a mistake to use the intermaxillary wiring method more than three weeks. It is better to get the splint that Dr. Kazanjian has designed, a single arch splint; for instance wiring the jaws together for ten days until the fibrous unions have started, taking the wires off and cleaning up the parts, and then putting a single arch splint on. We have a fibrous suture, parts in position and a good splint, obviating long treatment with the intermaxillary wire, which is very disagreeable. None of us would like to have our mouths wired for six weeks. Dr. Kazanjian feels that the radiograms of the head are not infallible. I think it is hard to detect the multiple fractures of the maxillary bones in anteroposterior films, and we are deceived by the best pictures, because there are so many shadows. I don't put much value in the roentgen ray for detecting these multiple fractures in the supermaxillary region and frontal region. I think that we ought to use our fingers and other means of diagnoses.

Stanley L. Rich, Nashville, Tenn.: Dr. Kazanjian seems to lay down an ironclad rule that all teeth in the line of fracture, or adjacent thereto, if they are loose or painful, should be extracted. I think that is a bad rule to make unless it is distinctly understood that we are to make frequent exceptions to it. I should like to report a recent case to illustrate my point, although my handling of the case was not entirely satisfactory to me. The patient was struck under the chin by a heavy iron beam, a fracture of the mandible in line with the lower second molar resulting, and the mesial root being severed from the rest of the tooth at the bifurcation. The distal root seemed to hold the crown firmly in position and it made good contact with the upper molars. The patient complained of some pain in the region of the fractured tooth, but it was not severe. The lower third molar was absent, and I knew that if I removed the fractured tooth there would be nothing to prevent the posterior fragment of the mandible from being raised to an abnormal position by the masseter and temporal muscles. Of course, a prop could be placed posterior to the second molar, but this is more or less unsatisfactory. I determined to try to retain the tooth, at least until we had partial union. The jaws were wired together, and, after the wires were tightened at a subsequent sitting, the roentgen-ray showed such teeth as remained in the mouth to be in good occlusion, and the line of fracture in the tooth could hardly be seen. For almost three weeks, the patient progressed satisfactorily. He complained of no pain in the region of the tooth, and the occlusion remained good. Then, a swelling developed on the buccal side of the fractured tooth. The cause was apparent, but as I wanted to keep the jaws wired together a little longer, I made a slight opening in the gum, liberating a quantity of pus, and inserted a gauze drain. As the inflammation did not subside promptly, I removed the intermaxillary wires and lifted the tooth out. At this time, I had a good

occlusion, and there seemed to be no mobility of the parts. I thought it would be safe to leave the wires off even though the period of immobility had not been quite long enough. The patient was a vigorous laboring man about 25, and so I took a chance. There was still quite a little inflammation in the region of the extracted molar. In two days, the patient returned and there was a slight change in the occlusion. There had been a drawing up on the fractured side, and now we have a slight malocclusion, which I am trying to correct with an elastic bandage worn at night. The point I am trying to make is that, as long as the fractured tooth was retained, the ramus was maintained in its normal position, and, on removal of the tooth, we had movement there. Even though the tooth in the line of fracture is quite loose or fractured, it will often aid in holding the parts in correct position, while the presence of an empty socket will have the opposite effect. Aside from this, if we have infection, the removal of a tooth will open additional bone areas to infection.

V. H. Kazanjian, Boston, Mass.: I should like to know how he handles a fractured condyle.

Emil L. Aison, Chicago, Ill.: In the treatment of fractures of the jaws, I believe it is imperative to remove fractured or abscessed teeth which are very near, or directly in line of, the bone fracture. Much difficulty to both the patient and the man who is in charge of the case is forestalled when that is done at the proper time. I learned this from experience, for I had to face this unpleasant problem. I would adjust the splint or intermaxillary wires and obtain good approximation of the bone fragments, and the early progress of the case as a whole would appear satisfactory. After a while, I would discover unexpected complications because an abscessed or fractured tooth was left *in situ*. A new swelling bordering almost on a cellulitis would invariably develop. The abscessed or fractured tooth acts in these cases as a foreign body, causing irritation, pain and suppuration and, not infrequently, much loss of bone substance through necrosis. Furthermore, broken teeth in the line of fracture may become abscessed at any time, and an old abscess may become active and acute. The use of such teeth for splints or intermaxillary wiring is unsafe and therefore contraindicated. Abscessed or fractured teeth or roots in line of fractured bone fragments not only cause much trouble but also interfere with proper bone union unless removed.

G. H. Wright, Boston, Mass.: I have had experience for twenty-three years with fractures of all kinds in the jaw, and I believe, that, as regards the patient, if you have broken process and loose teeth adjacent to the line of fracture, you are running less risk to remove those teeth. The situation is somewhat modified by the condition of the patient. As a rule, if we have very loose teeth to deal with, it is well to avoid further complications by getting them out of the way.

F. B. Moorehead, Chicago, Ill.: For several years, I have been using the fixed splint, first suggested by Dr. Gilmer, but, in later years, I have had great satisfaction in the mobilization of fractures of the lower jaw with the ribbon arch, adapted by a competent orthodontist. Applied by one who understands its use, it is the simplest and best means of fixation I know, and one that permits of the freest use of the jaw. Cases of fracture, complicated by infection or edema are, of course, to be handled on a basis of individual needs and indications.

Dr. Kazanjian (*closing*): The only point over which there seems to be any disagreement is the question of the retention of teeth in the fractured area. As I pointed out in my paper, in isolated cases it may be permissible to delay the extraction of the questionable teeth for the purpose of controlling the segment of the bone. Unnecessarily long retention of these teeth will invite trouble and cause delay in the healing process.

FOCAL INFECTION FROM THE POINT OF VIEW OF THE DENTIST*

By E. H. HATTON, B.L., M.D., Chicago, Illinois

NO recent contribution has done more to dignify the position of the dentist, or to increase his responsibility, than the theory of focal infection. However grateful he may be for the former, the added burden of this increased responsibility for health conditions remote from the mouth is not a welcome one. But if the validity of this theory is accepted to any degree at all, he must accept this added burden with all its consequences, or give up the practice of his profession.

One would neither care nor dare to to refute this hypothesis of focal infection *in toto*. To the men and women who are practicing the healing art, it offers so promising a resource both in diagnosis and treatment, that to give it up entirely would handicap their therapeutic procedures to a noteworthy degree. In the second place, so much evidence favorable to its acceptance has been accumulated in the last decade that it is hard to conceive of a person's being rash enough to deny this hypothesis completely. At least such an individual must be classed with those who refuse to accept the statement that the earth is round and revolves about the sun, or with those who do not believe in the theory of evolution.

According to this theory, germs or bacteria of a low grade of virulence have the property of locating, or colonizing, in certain favorable positions beneath the skin covering of the outside of the body, or within the mucous membrane lining such cavities as those found in the digestive tract, and the respiratory and the genito-urinary system. In such places, these bacteria produce lesions that either remain symptomless or cause symptoms of such a vague character that their inflammatory nature is not recognized, lesions whose progress and development are not noticed and which, therefore, exist for long periods of time—months or years—before any measurable damage is done. It is assumed that from those lesions either bacteria or their poisonous products are supplied to the blood stream or the lymph, to be carried even to the most remote parts of the body, where either similar colonies are planted if living bacteria make their way into the blood stream, or damage is done to highly specialized cells if only the poisonous bacterial proteins are discharged into the blood or lymph.

There is a marked difference be-

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tween these two processes, since the first may be compared with the distribution of seeds from a cottonwood tree; wherever a seed lodges and develops into a new tree, another center for the distribution of seeds is established which may, and does, continue to exist long after the original tree has been destroyed. In just the same way, a secondary colony of bacteria, that is, a secondary focus may, and no doubt does, exist in many cases long after the original focus has been eliminated. From this secondary focus, which now acts in all respects like the original, bacteria and their poisons may be distributed as freely as from the first, though that has been completely destroyed.

If only the poisons, that is, the toxins, find their way into the body fluids, the secondary lesions are not bacterial foci, cannot reproduce the original focus and must become inactive as soon as the primary lesion is eliminated. However, the secondary changes may be of such a permanent character as to handicap the organ or part involved.

There are two paths by which bacteria break through the protective lining of the dental arches in the mouth. This lining has a greater degree of resistance to bacterial penetration than any other part of the body, and even after the bacteria have achieved penetration, the inflammatory reactions which they produce are usually of a very low grade. The first is by bacterial penetration through defects in the crown of the tooth produced by caries, abrasion, erosion or accident. Since it is impossible to close such breaks by any form of epithelial repair, the only resource the body has is found in the connective tissues. Secondary dentin and more or less dense walls of connective tissue, first in the pulp and later at the apex, are thrown across the pathway of the invading bacteria. This noteworthy development at the apex constitutes the so-called granuloma, abscess sac or area of apical inflammation, consisting essentially of granulation tissue containing bacteria, more or less constantly, and surrounded by a fibrous tissue envelop that may be complete or only partially developed. The important consideration is that this encapsulation is only partially effective, since as long as bacteria are present in the region, either they or their poisonous products have a possible easy means of access to the circulation.

The second break in the epithelial covering occurs at the junction of the epithelium and the crown of the tooth at the bottom of the gingival trough. The epithelial lining of this trough is thin, and not calloused and tough as is the epithelium of the rest of the mouth lining. With the exposure of the connective tissues here, a reaction takes place similar to that found about the apex previously described. It is probably true that bacteria are less likely to find their way from such locations to remote parts, but it is also true that their toxic products find a way very readily into the lymph spaces, and thence into the blood stream. It seems essential that these poisonous bacterial proteins must find their way into the circulation by some direct path, in order

to cause damage, since, in their passage through the alimentary canal, these toxic substances are destroyed by digestion.

The literature is full of instances of infections of the first class, associated with disease elsewhere in the body, which have been cured by elimination of the inflammation at the apex of the offending tooth. Perhaps because the opportunity for drainage seems so ample in a pyorrhea pocket, there has been great hesitation in emphasizing the existence of a similar relationship of cause and effect between pyorrhea and systemic disease. Yet there are illustrations in such abundance of the improvement or cure of remote body disease following elimination of a pyorrheic condition that if the relationship of cause and effect is accepted in one case, it must be granted in the other.

On the whole, up to this point there is little difference of opinion. It is generally agreed that infection by bacteria, whether acute or chronic, is a menace to the host, and must be eliminated as speedily as is practical; and, furthermore, that, as far as possible, the development of primary foci must be prevented—a phase of preventive medicine and dentistry.

It is in the details of the application of this theory to the solution of the problems involved in treating and preventing such infections in the mouth that the widest divergence of opinion has arisen.

The views of the most radical group in the dental profession may be summed up as follows:

1. The most frequent location of the primary focus, that is, the beginning of this condition of focal infection, is found in the mouth, and particularly around the apices of teeth.

2. Such low grade infections, including those just mentioned, as well as tonsil infections and many others, are the commonest sources, if not the only sources, of the degenerative diseases of the latter decades of life, such as heart and kidney disease, arthritis and even cancer.

3. When the apical region about a tooth has been infected, such infections can be cured only by the removal of the offending tooth, because such a tooth, when treated and filled, invariably becomes reinfected in a short time.

4. Since all pulpless teeth are dead teeth, such teeth, even though the pulp canals and apices are not infected, should not be treated, but should be extracted.

5. Even in the earlier stages of caries and pyorrhea, the tooth pulp has already begun to degenerate, or has become infected, and the apex, if not actually infected, is potentially infected, and the health of the remote organs and tissues are already threatened.

Such theories call for a careful analysis.

As to the prevalence of these low grade infections in the mouth, there is little difference of opinion. The data accumulated by Black have been widely quoted, and, as far as I know, have never been questioned. According to his belief, dental infection, not at all rare in the earlier decades of life, gradually increases until, except in edentulous mouths, only from two to five of

every hundred individuals are without radiographic evidences of such infection in the last decades. On this basis alone, since chronic mouth infection occurs more frequently than in any other place in the body, it has been assumed that the mouth is the most common location for the primary focus in focal infection.

As far as I know, no one has ever been able to isolate germs from the blood of individuals suffering from low grade infections of the type found in the tonsils or about the roots of the teeth. Even the blood of animals injected with billions of bacteria cultured from such low grade infections rarely supplies a positive culture test. The mechanism of the penetration of bacteria from acute and chronic infections cannot be essentially different, except that bacteria from acute conditions probably enter the blood stream in greater number, and, because of their virulence, persist longer. There should be a rough parallelism between the frequency of the origin of acute and chronic conditions in the various parts of the body. Walton Martin studied the sources of bacteria recovered in the blood in 162 cases. Of these, fifty originated in the trunk; twenty-five in the middle ear and mastoid region; twenty-three in the head and neck; eleven in the hand and arm; eight in the legs and feet, and six in the lips and cheeks; and thirty-nine were not traced to their source. From such figures, it is difficult to make a strong case for the outstanding importance of the mouth as a source of focal infection.

It occurred to me that a study of the sources of maxillary sinus infections might supply valuable information as to the relative importance of mouth foci. According to this analysis, not more than 30 per cent are primary in the mouth.

Not only do such figures tend to discount the relative importance of the mouth as a source of primary foci, but they also supply an adequate explanation for the many disappointments encountered by clinicians in treating focal infection by eliminating all traces of mouth infection.

These theories differ markedly from those of individuals who see a great hazard, not only in every infected tooth, but also in every pulpless tooth. There are those, indeed, who by using bacteriologic methods, find every pulpless tooth an infected tooth though such teeth are radiographically negative. Rosenow, for example, states that he has yet to find a pulpless tooth from which he has not isolated streptococci or similar bacteria. But this statement in many instances, is based upon the appearance of a single colony in his shake cultures. Haden, using the same methods and reproducing Rosenow's results in most respects, not only finds instances of pulpless teeth that are negative culturally but also feels that he must have at least ten colonies in his culture tubes before he permits himself to be convinced that such teeth are infected. Haden's work is interesting in that he finds teeth with positive radiograms that are negative by bacteriologic methods, as well as teeth that are negative in the radiograms but that harbor bacteria about their apices, and that have gross evidences of infection.

A careful study of teeth with apical infections in which the infected area is surrounded by intact, thick, fibrous capsules, was made by Loeffler, a German investigator. He found that a little less than half harbored bacteria, mostly green producing streptococci, and he came to the conclusion that, in this type of apical infection, the bacteria tend to be destroyed, and not only that this represents a healing process, but also that it is hard to conceive that bacteria may be distributed to remote parts of the body from such lesions. This corresponds to an opinion expressed by Gilmer, and in part with my own observations. I am not yet convinced that bacteria do not make their way into remote parts from such lesions.

Apparently, one important consideration has been overlooked in the study of these lesions by bacteriologic methods, including inoculation of animals. The reported experiments, as far as I know, largely concern bacteria from individuals who are harboring not only apical infections, but also demonstrable lesions elsewhere in the body; that is, the bacteria come from persons who are sick, persons who have comparatively little resistance to bacterial invasion. A series of experiments made in our laboratory, using bacteria recovered from apical infections in individuals exhibiting no other evidences of disease, has yielded surprisingly few lesions in inoculated rabbits. On the other hand, we have been able to demonstrate a definite selective localizing tendency in other cases. Mendel produced similar results by inoculating mice with streptoccocci, isolated from apical infections. And it may be just this condition that has prevented the repetition of Rosenow's results in the hands of other workers.

In asthma, Koessler is of the opinion that about 60 per cent of these phenomena may be traced to non-bacterial intoxications such as plant pollens, and that only 40 per cent are of bacterial origin.

There is, therefore, good reason, while realizing the potential menace of mouth infection, to discount the part played by it in the production of foci elsewhere in the body, or in the production of the degenerative diseases of the latter decades of life.

Our studies made on pulpless teeth harmonize with those of others, indicating that pulpless teeth are not dead teeth, and that even teeth with infected pulps and apices, under certain conditions may be treated, with a high percentage of successful results.

While it is true that the pulps of teeth are very responsive to both disease of the crown and the peridental membrane, and are likely to develop degenerations secondary to caries and pyorrhea, these changes are highly localized and not a potential hazard to the health of the individual as has been suggested.

There seems, therefore, some rational ground for the adoption of clinical methods based upon arranging our patients into two general groups: those with mouth infection, but without noteworthy evidences of secondary infection; and those suffering from diseases of a degenerative type with multiple lesions, a condition so charac-

teristic of the victims of disorders of this kind. It would not be at all remarkable if focal infection, instead of being primarily a local condition, were a distinct disease entity. This statement is the reverse of the usually accepted opinion, and must be taken merely as a suggestion.

The recent trend of theories respecting nephritis are of interest in this connection. Most of us have been taught that nephritis is primarily a disease of the kidneys, and that the rest of the body is involved only so far as it is impaired by the failure of the kidneys to function. This newer theory assumes that nephritis, instead of being a local condition, is a general condition; and that all the cells of the body are involved, and the changes in the kidney cells parallel those of the rest of the body and do not precede them.

On this account, I can and do sympathize with the effort of Price to classify those persons having mouth infections into groups; one, susceptible to secondary infections; another, immune, and a third, midway between the other two. Unfortunately his susceptible group contains those who have apical infections that are small and distinctly encapsulated, just the type of lesion that Loeffler, Gilmer and others associate with a healing process and the reduction of the number of bacteria in the lesion, or even the actual extinction of the bacteria, as well as relative freedom from secondary infections. These two sets of observations cannot be reconciled, and it is difficult to believe that the whole company, with the exception of one man, is out of step.

There are two phases of the incidence of mouth infection that are given but comparatively little attention: first, that mouth infection is an index of the individual's reaction to infection, and that it parallels degenerative conditions elsewhere in the body rather than precedes them; and, second, that mouth infection may, and often is, secondary to chronic infection elsewhere in the body. After all, the mucous membrane and the tissues of the mouth have a resistance to infection that is far greater than that of any other part of the body. If it were not so, the hazard of the practice of dental surgery would be much greater than it is.

It is a general truth that, in the long run, the most promising means of handling any infection consists in raising both individual and racial immunity, and to this end such resources as vaccination, diet and other preventive measures of the same kind are more to be prized than a rigid adherence to therapeutic procedures based on the elimination of parts of the body which may become the seat of such infections.

Throughout this paper, I have stressed the idea that focal infection still has the status of an hypothesis, and that, in its application both to the individual case and to the whole process of infection, this point of view must be maintained. One can neither promise the individual nor the world that, if all traces of mouth infection are eliminated, a noteworthy, substantial, favorable result is bound to follow.

Our promise to the individual should be guarded. There may be a connection between his mouth infection and his broken health. If so, the effect of

its removal may be almost miraculous. If not, our efforts will be entirely in vain. Our promise to the world must be equally guarded. We have no right as yet, on the basis of the evidence that has been submitted, to assume that the removal of mouth infection is going to exercise a profound influence upon the incidence of the degenerative diseases of the latter decades of life. We may, and do, hope it is so.

I am most friendly to this hypothesis; but I do believe that I can do the cause the best possible service by stressing its limitations at this time. On the other hand, overemphasis of its application to dental infection is bound to hamper its progress. It is my hope that the dental profession will adhere to a middle-of-the-road program, neither relapse to the sloppy procedures of the past decades, nor be carried off its feet by the adoption of a policy of extreme radicalism.

DISCUSSION

P. G. Puterbaugh, Chicago, Ill.: From the standpoint of the physician, life is a game in which invading bacterial forces and inward disharmonies are pitted against the patient's resistance. A game that is always, sooner or later, a losing one. Human bodies wear out and the final death rate is one hundred per cent. While the profession of dentistry, in its inception, considered primarily the production of oral comfort through dental conservation and prosthesis, it has recently and all unwittingly stumbled pell mell into the realm of general medicine. Is it therefore any wonder that, under the suddenly assumed status of the new order of things, conflicting ideas and emotions should beset the profession even to the point of threatened disruption? that much time and study are naturally required in order to readjust the psychologic processes of men to the newer responsibilities thrust upon them? It is only natural to expect that radicalism and overenthusiasm will be shown by the inexperienced practitioner who permits his zeal and eagerness to bring about miraculous cures to overbalance the judgment of a mind which never had the basic training to fit it for fundamental understanding of what Dr. Moorehead is pleased to term "the problem of the patient." In the light of researches into the realm of medicodental problems, this paper is therefore timely and proper. From it, we learn that radiographic evidence, transillumination and all other readily available means for diagnosis fail to provide dependable indicators as to the presence or absence of periapical infections; that the mechanism of infection lacks uniformity and the toxicity of the invading organisms, when pitted against the immunizing powers of the host, determines the resulting pathologic changes; that the eradication of primary foci often fails to modify the course of disease and that, after all, it is only incumbent on the dental practitioner to locate and eliminate 15 per cent of all focal infections since, according to Martin, 85 per cent of them occur elsewhere in the body. The elimination of all suspected dental foci in patients with ill health and broken resistance should be the duty of every dentist, but on the other hand, the tactics of certain members of the self styled 100 per cent group, whose methods savor more of the charlatan than that of the thoughtful, conscientious student of pathology, should be most vigorously condemned. Let us, in our diagnoses, be careful, broad-minded and thorough; in our prognoses, guarded and, in our treatment, honest. Let us be students as well as practitioners, to the end that our profession will be dignified and our patients be the recipients of the best that present day science can offer.

Arthur D. Black, Chicago, Ill.: Ten years ago, many of us had rather clear ideas of the procedures which we should follow in handling chronic infections within the mouth. As the studies of such men as Dr. Hatton and Dr. Rosenow have proceeded during this decade, I believe that most men who have endeavored really to study this problem have become more and more uncertain regarding it, because they have come to realize that the problem of chronic mouth infections in relation to general systemic disease is not so simple as it appeared ten years ago. Referring for a moment to Dr. Rosenow's work, especially his studies of the selective affinity of micro-organisms of the streptococcus group for certain organs and tissues within

the body, and without questioning the accuracy of his researches, I wish to suggest an explanation of the variation in strains of streptococci found in areas about the teeth or in any group of so-called original foci. First, we must take into consideration the fact that Dr. Rosenow's animal inoculations have been made almost entirely from patients who were affected with secondary lesions. It would seem to be within the range of possibilities that the infected areas about the teeth might not be the cause of the so-called secondary lesions, but that the mouth areas might have been secondarily infected from the lesions, elsewhere in the body. If this is so, in any given case the mouth lesion would contain the particular strain of streptococcus which had developed in the gallbladder, stomach, ulcer or joint, and animals injected with cultures from the mouth areas would be likely to show a high percentage of involvement of gallbladder, stomach or joints, corresponding to the lesions of the patients from whose mouths the cultures were made. In other words, the wide range of selective affinity of the organisms taken from mouth lesions suggests the probability that the organisms inhabiting the mouth areas change in accordance with the systemic infection elsewhere in the body, and suggests also more of uncertainty as to the casual relationship of the mouth lesion to the systemic lesion. In our research laboratory, Dr. Hatton has inoculated a limited number of animals with organisms from infected areas about the teeth of persons who were otherwise apparently free from infection, and he states in his paper that animals injected with cultures from these chronic mouth infections of patients who are otherwise apparently well do not show anything like the same secondary effects as do the animals that are injected with cultures taken from the mouths of patients known to have other lesions. In the report of DeNiord and Bixby of Buffalo[1] a few years ago, it was claimed that the uric acid content of the blood indicated whether the patient had a focus of infection which was doing him harm, and, after the focus was eliminated, another test would show whether the patient was free from infection or whether there might be another focus. Unfortunately, they experimented only with patients who had so-called secondary lesions. They did not report studies of patients who had only mouth infections and no discoverable secondary lesions. We gave that problem to one of our graduate students, Dr. Emil Mueller, and he studied about five times as many cases as did DeNiord and Bixby, including one group of patients who were apparently well, having no mouth infections or lesions elsewhere that could be discovered. When these patients were kept under hospital conditions (put to bed for a few days), there occurred a wider variation in the uric acid content of the blood than the widest variation DeNiord and Bixby reported in cases having both local foci and secondary lesions. I mention this to emphasize the point that there remains much to be learned by painstaking and extensive research in this particular field. I should like to emphasize the point that Dr. Hatton made that where the secondary infection is a bacterial one, where the bacteria from the original focus get into the circulation and localize in some organ or tissue, as in a joint, we have no right to expect that that secondary lesion will heal because we eliminate the primary focus, because the bacteria have definitely established themselves as an independent colony in the secondary location. In those cases in which it is only the toxin that gets into the circulation, the secondary infection should be cured by eradication of the original focus. In passing, I might mention that, in cases of pyorrhea, we are more likely to have a secondary effect from the toxin than from the bacteria themselves. I should like to call attention to one other condition which Dr. Hatton has demonstrated by examination of the extracted teeth with abscess sacs attached, both in the gross specimen and by microscopic studies; viz., that in at least a few cases in which a radiogram shows the end of the root apparently projecting into a cavity of the bone, there is no destruction of the peridental membrane at the apex of the root and the cementum is not necrosed; therefore, such cases are not incurable. In these, the infection from the pulp has evidently passed through the apical foramen into the bone, without destroying the fibers of the peridental membranes immediately about the apex. From these fibers, a capsule formed about the infected area. The abscess cavity gradually grew larger, destroying bone about the apex of the root, the peridental mem-

1. DeNiord, R. N., and Bixby, B. J.: J. Lab. & Clin. Med., 7: 573 (July) 1922.

brane maintaining its vitality. Eventually, bone was destroyed about the sides of the root, near the apex, the abscess, with its fibrous capsule taking the form of a rubber ball, one side of which is pushed in until it is concave. The end of the root is in the concave portion, and the fibers of the peridental membrane are folded back against the sides of the root. Such an abscess should heal after the removal of the dead pulp and the proper treatment of the root canal. Unfortunately, it is not possible to make a differential diagnosis in such a case, but these studies explain the occasional cases in which the lesions appear hopeless in the radiogram, and yet appear to heal promptly following treatment, the tooth remaining in good condition indefinitely. I think we may be justified, especially in the case of a young person who is in good health, in treating such a tooth and following up with subsequent radiograms, so that we can check definitely on our results. I should not think of doing such a thing in an older person, especially one who showed some other manifestations of disease. In the light of our present knowledge of the relationship of our teeth to the general health in this great problem of focal infections, we are coming more and more to realize that there is no fixed rule that can be laid down for the management of these cases; that we must study more carefully each case which presents, to the end that we will use our best judgment in determining what should be done. We are not justified in saying that we should extract every tooth that presents with a dead pulp; or that we should extract every tooth that shows rarefaction of bone at the apex of the root. We should not rely on the radiograms for either diagnosis or treatment.

C. F. B. Stowell, Chicago, Ill.: The views set forth in the first seven pages are plainly those of a medical man, as distinguished from the dentist. Introspection must make us aware of the serious limitations placed on the dental profession as a whole through a wrong attitude in its educational methods. These methods have been synthetic in place of analytic. As students, we were impressed with the thought that the tooth was an entity *per se.* From this, we built a body around our concept, and all the time the tooth was the center or nucleus. Is it a wonder that we overstress the importance of a tooth? Spencer incorporates the thought thus: "If the part is conceived without any reference to the whole, it becomes a whole—an independent entity; and its relation to existence in general is misapprehended;" further, "where the whole is organic, does a complete comprehension of a part imply extensive comprehension of the whole." I am glad that Dr. Hatton said, in effect, that the profession must accept the added responsibility that comes from a realization of the potential mischief of a dental focal infection. The first part of the paper is a clear straight forward statement of a theory that has almost reached the status of a law. It is hard to imagine how one could state the case better. The reading of Dr. Hatton's views of the creed held by the so-called radicals makes one wonder as to its sincerity. There are five groups of thoughts, and I am quite sure it would be hard to find anyone who would subscribe to them *in toto* as here worded. Surely no one ever agreed to number one or number two. Of the third statement this can be said, nothing to the contrary has been proved. In regard to number four in which Dr. Hatton says, "Since all pulpless teeth are dead teeth, such teeth although the pulp canals and apices are sterile, should not be treated but should be extracted," it may be said that the particulars of the statement are too vague. When we enter into the discussion of what is dead, and what is alive, or what is vital and what is nonvital, we must agree on definitions. Surely a pulpless tooth is partly dead. If it is partly dead, it will be entirely so shortly because of contact of dead cells with the living. The latter lose, because of the irritants given off by the former in the processes of disintegration. We are all familiar with somatic death and cellular death. In the former, the body is prepared for burial. If, after burial, in the lapse of a short time, on exhumation, it is common knowledge that the hair and nails have grown, cellular life being thereby demonstrated, the person was not buried alive. He was really dead, but there was cellular life in the body. So it is with the tooth. The peridental membrane may be attached to the cementum and, for a time after devitalization of the pulp, it may function properly. And so we have, temporarily only, the dead tissue existing with the living. If the whole tooth were inorganic, sterility once established could be maintained, but, in the case of a tooth, we have an inorganic and an organic

structure. This cannot be maintained sterile until disintegration has transformed the organic part to its end-products of carbon dioxid and water. In the body, it may become encapsulated in a sort of sarcophagus, but this encapsulation is subject in itself to disintegration. The breaking of the cyst wall, the granuloma or whatever the type of the quarantine, makes leaving the dead organic matter and its toxic by-products in the living body insecure and unsafe. Constant vigilance is not good enough protection for the host. Yet we leave these things in the jaws, and because there is no violent local reaction, or great radiographic evidence of a disturbance, we consider the host safe, forsooth. I believe that, as a profession, we are approaching an adoption of the principle of number four. It is the ideal. Eventually the public will have to beware of pulp involvement. In dealing with Dr. Hatton's fifth view, we find ourselves in a discussion of evolution. The dental profession is trying to stay the hand of time. It is heroic work. It is bound to fail. Evolution takes plenty of time in accomplishing its work, but the results are inexorable. As a profession, we are trying to retain very highly specialized organs the function of which is passing by the agency of another highly specialized development of man, namely, the modern grocery. Whenever environment that produced highly specialized characters changes, the highly specialized organs cannot modify themselves and so cease to be. The teeth are joining the tonsils, the appendixes and other vestigeal organs. As these are subjects of frequent pathologic conditions, so are the teeth, and you can follow the analogy clear through and see the end. This is why there is so much more work to do than the present profession can possibly do. Babe Ruth is not asked to hit a home run every trip he makes to the plate. Neither is every infected tooth going to cause an infection in an appendix, or a knee, or a heart valve, but if the batter gets a .300 he is considered efficient enough and if an infected tooth is 30 or 40 per cent effective, isn't that enough? I have seen too many cases benefited to allow to pass unnoticed the fact that there were disappointments after removal of dental infections. However, if bacteria have been carried by the blood or lymph and they have selected a distant part of the host as an abode, it does seem rather asking too much of oral surgery to eradicate the secondary infection. What is the answer? This: These infected teeth should be removed before the distant foci have been established. We would thus practice prophylaxis with the medical point of view. I heartily agree that infections about apices are present in radiographically negative cases and conversely. As to Dr. Hatton's statements concerning treating teeth with infected pulps and apices under certain conditions with successful results, I cannot agree, unless there is a meaning used here that I do not use. Many things can be done as viewed from the mechanical side that should not be done as viewed from the pathologic. In every case, the dictates of the pathologic should have the right of way. Dental infections may not be the chief factor in the break of an individual, but, if present, they are a factor in every case, and as such should be removed. Their removal represents the least possible disturbance to the body from surgical interference. I think it is almost universally admitted that bacteria do find their way from apical infections to remote parts. To me, this is important, and even if the percentage is low, it is a great truth—one well worthy of bearing in mind *continually*. If in 30 per cent of cases such results are to follow, it seems to me that the removal of highly questionable teeth, questionable either radiographically or on physical examination, is highly justifiable. I don't think we should be as horror stricken as we seem, if we always prevent dental infection metastases even though we occasionally remove a questionable tooth. Such expressions of horror, however, are only the manifestations of the effects of a traditional misapprehension of the importance of a part as compared with a *whole*. I don't like a middle-of-the-road policy, I would rather be right. I would rather favor conservation of health than conservation of teeth. I am not what in politics is called a trimmer, and I am for the person who figuratively speaking has a definite effect on litmus. The middle-of-the-road policy will lead to as many errors as proper procedures, and at what cost? The extremist is at least colorful, the neutral can hop from one position to another with wonderful facility and can never be proved wrong. I would like to know how much harm an infected tooth is supposed to do before an extraction warrant is issued.

Dr. Hatton (closing): It is a great surprise to be accused of insincerity in presenting a summary of the so-called radical group. I did not intend and do not believe that what I said should be interpreted to indicate that any one individual had announced such a program, although I believe that such a person or persons exist. I shall quote authority only for points 1 and 2. At the Dallas meeting of the American Dental Association, J. P. Buckley made the statement found in point one. Further evidence in support of my contention as to the authenticity of point one, as well as point two, is found in the introduction to Price's "Dental Infection" (Vol. I, pp. 16 and 23). The remaining three points are not only accepted by Dr. Stowell, but also ably defended by him. I must, therefore, still insist that these five points present a fair view of the more radical wing of the dental profession concerning the dental aspects of the problem of focal infection. As I have discussed the biologic standing of the pulpless tooth elsewhere, I shall say but little in defense of my belief that a pulpless tooth is not a dead tooth. Certainly a replanted tooth is clearly a dead tooth, and the surrounding tissues react to it just as though it were a dead tooth, by absorbing its root and exfoliating it. The peridental membranes of pulpless, but otherwise unchanged, teeth cannot be distinguished, histologically, from those of teeth with healthy pulps. This fact has always seemed to me conclusive of a decided difference between a dead tooth and a pulpless tooth. Probably I am entitled to the conviction that Dr. Stowell and others believe that any lower estimate of the menace of dental infection than theirs is either out of place or radically wrong at the present time; or believe that the statements that I have made are likely to encourage the more conservative dentists to persist in practices that are likely to result disastrously. Yet nothing has been said in this paper that can be interpreted in any fashion whatsoever, as an argument for the retention of mouth infection, for when it comes to the elimination of mouth infection, I am most colorfully radical. But there is all the difference in the world between eliminating infection and removing parts of the body that may become infected. There is also, in my opinion, the widest difference possible between a "trimmer" and a broad-minded man. May I remind you that the word "doctor" originally signified a learned person, and, further, that the very foundation of a doctor or scientist is, or should be, broad-mindedness? I have asked and do ask again that in the interpretation of the significance of mouth infection, the members of the dental profession have open minds, to the end not only that they may serve their patients better, but also that the science and practice of dentistry may make the greatest progress in the shortest time.

WAX SPRAY METHOD FOR FACIAL CASTS*

By ERIC H. GOLDEN, D.D.S., St. Louis, Missouri

RECORDS of cases are essential, and especially so, when alteration of any part of the face or body is involved. Facial casts show various facial developments better than do photographs, and are especially desirable in cases in which patients have an unequal development of the face. This phase is of importance mainly to orthodontists. In plastic surgery and in oral surgery, when facial contour is changed, the facial cast is an important record and a great help to the operator.

With the rapid strides made in prosthodontia in late years, the facial cast will be recognized as a necessary factor in the routine technic of the construction of dentures, which will include restoring the facial contour of the patient by actual measurements.

In fact, there is need for casts for records in many branches of medicine and dentistry, and when the making of casts does not have the objectionable features involved in the use of plaster and has all the good features claimed for plaster in taking impressions, both patient and operator are benefited. Besides facial casts, or casts of any part of the body for that matter, there is a field for this work in cast saddles and clasps for bridges and also in cast palatal bars and dentures, the technic for which will be given at some future time. This paper will be confined to the uses of the wax spray method in orthodontia.

I conceived the idea of taking casts by the wax spray method from the method of spraying wax on burns, to exclude air, employed by physicians during the war. However, with the wax spray method, using warm compressed air gives us added advantages. We have a finer deposit and a continuous spray of wax, and so can deposit to any thickness with great speed, as the wax is maintained in an ideal condition for that purpose. The method should be of greater service to physicians in covering larger areas, and of giving any thickness of deposit very rapidly. I may state here that, at both my clinics, at the 1925 Session of the American Dental Association and the 1926 Midwinter Clinic of the Chicago Dental Society, the first question invariably asked was "How can a patient stand the heat?" We overlook the fact that, while the wax is in a molten state, it has a low melting point and even when it is sprayed with warm compressed air, and the area covered is comparatively large, the deposit of wax is very thin and hardens rapidly and the sprayer is kept moving continually, so this first layer is not uncomfortable to the patient. All additional layers are not felt in the

*Read before the Missouri State Dental Society, Kansas City, Mo., May 11-13, 1925, and presented as a clinic at the Sixty-Seventh Annual Session of the American Dental Association, Louisville, Ky., Sept. 21-25, 1925.

*Research and technic developed at the St. Louis University School of Dentistry.

least, as the first layer acts for the tissues as an insulator from thermal change.

TECHNIC FOR SPRAYING WAX

The patient is placed in the chair in a comfortable position, the head resting at about an angle of 45 degrees; with a large towel or an operating gown protecting the clothing.

For a full facial cast, a towel is folded and placed above the forehead and pinned together at the back of the head. Another towel is folded, placed around the neck and pinned in position at the back of the neck. (Fig. 1.)

For partial casts, the patient is placed in the chair as described for full facial casts, and the first towel is placed over the eyes at the bridge of the nose and pinned at the back of the head. A pellet of cotton may be placed between the eyes and the towel. The second towel is placed exactly as in full facial casts. (Fig. 2.)

For profile casts, the procedure described in various orthodontia textbooks is used; i.e., a piece of soft lead wire or fuse wire is used to obtain an outline of the profile; and this is transferred to a piece of stiff cardboard, marked, and cut to fit the face. This cardboard is then placed in position on the median line of the face, and a towel is placed over the hair, if the latter is not included in the cast. An attendant holds the cardboard in position while the impression is being taken.

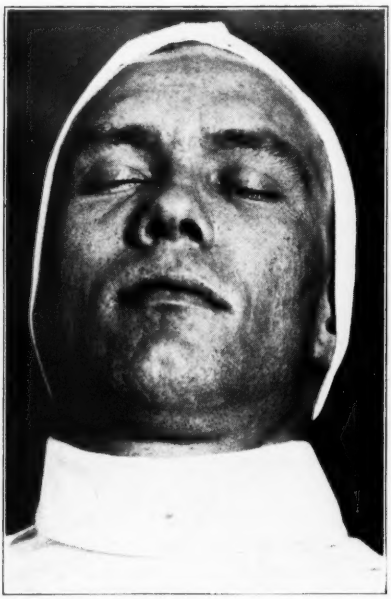

Fig. 1.—Position of patient and method of placing towels to spray wax for a full facial impression.

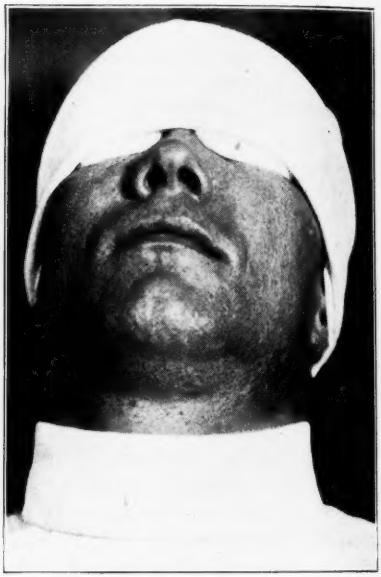

Fig. 2.—Position of patient and method of placing towels to spray wax for a partial facial impression.

No lubricant is necessary, but, if desired, oil or warm petrolatum can be painted on the lashes, eyebrows or hair, so that the hair will lie smooth. It is well to lubricate the hairy parts, and paint them lightly with warm wax on a brush before spraying, as we thus get a more even impression of the hair.

Rubber hose is not needed in the nostrils if a thin piece of wax is used to make two tubes. These are placed in the nose after being lubricated with petrolatum. The wax, which is sprayed

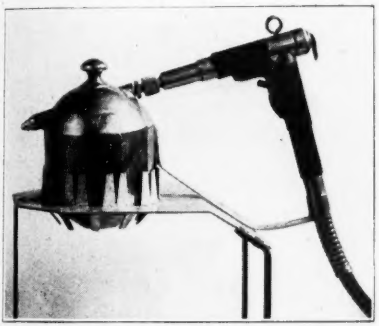

Fig. 3.—Compressed warm air wax sprayer used for spraying wax. The small tip used for the first layer, the large tip for the second and all subsequent layers.

around the nose first, solidifies immediately and the wax tubes, having served their purpose of allowing the patient to breathe freely without distortion of the nostrils, are removed and the spraying is continued. Or we may place a cotton roll lubricated with petrolatum in one side of the nose and spray around it, transferring it then to the other side.

The case is now ready for the wax spray. The material used is a specially prepared composition called blue spray wax, which has a low melting temperature, hardens very rapidly, gives a clear and accurate impression and does not drag or stick. The color aids in the detection of any wax left on the cast and renders the finished plaster cast whiter, or, we may say, bleaches it. A specially prepared material called white

Fig. 4.—Various layers as deposited on tissues: 1, insulating layer of wax; 2, body layer of wax; 3, rough layer of wax; rigid layer of plaster.

sterile spray wax can be procured for cases where indicated; i.e., when cuts, or sores are present. Also, there is a technic spray wax, used for bridge saddles, clasps, partial and full denture impressions, etc., which gives an absolutely accurate impression for the result-

ing casts, as it gets extremely hard and can be sprayed very thinly.

The wax is melted in a container made for this purpose, called the compressed warm air wax sprayer. (Fig. 3.) After the wax has been heated until it is liquefied (this can be accomplished by heating slowly over a bunsen burner or an electric stove), the top is clamped into place and the warm air sprayer is screwed into position.

Fig. 5.—Rigid layer of wax sometimes used over first, second and third layers of sprayed wax, instead of using plaster. This method is seldom needed.

The wax is now sprayed on the face, low pressure (about 4 pounds) being employed for the first or insulating layer, the operator starting preferably on the side of the cheek and keeping the spray moving continually. The heat pushbutton on the hot air attachment is used as needed if the wax becomes cool and shows a tendency to clog. Thus, we always have an even flow of wax, giving a very fine deposit upon the tissues.

For facial casts it is best to spray a thin layer of wax over the face first, and if the sprayer is kept at a distance of about 2 inches from the skin and is kept moving, with just enough air pressure to force the wax through the nozzle, a fine thin film will be deposited.

If the sprayer is kept moving and a

Fig. 6.—Left: Partial facial impression ready to pour. No tubes are used and the cast was sprayed to include anterior teeth and gum tissue. The rigid layer of plaster need not be so heavy as shown. In this case, it was made so for the purpose of teaching, since the student is liable to spread the layer of wax too thin and risk ruining the impression when removing from the face. Right: Completed plaster cast. No instrument or knife has touched the cast and there has been no stippling. Separation was accomplished merely by melting the wax.

thin layer only is sprayed on the tissues, no pain is felt; in fact, the warmth has a sedative effect on the patient because the wax is sprayed on so thinly. Since quite an area of the skin is covered quickly, no discomfort is experienced.

Because the first or insulating layer

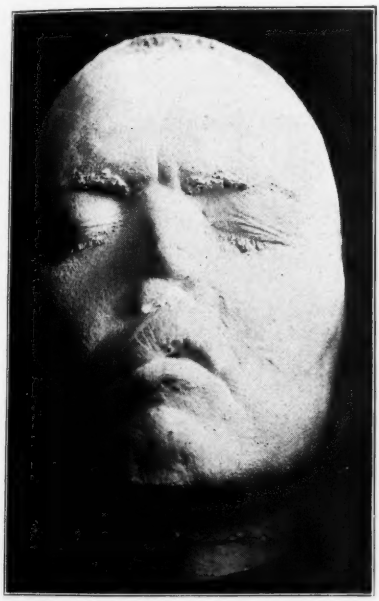

Fig. 7.—Case taken before plastic surgery operation. Detail of scar and around nose may be noted.

acts as an insulator, the addition of any wax will not be felt. The entire face is gone over a second time, the second or body layer being made thicker by using a large tip on the sprayer (Fig. 3) and higher air pressure (about 10 pounds). By this means, more speed is also attained. A one-sixteenth inch deposit is ample except in special cases, when a little heavier deposit may be desirable.

Any depressions or undercuts should be filled in with a spatula, wax in the congealing stage being employed, or we may use the large tip on the wax sprayer and fill in by spraying over the depressions several times, to prevent the rigid layer of plaster which is to follow later from becoming locked.

Fig. 8.—Case taken before plastic surgery operation. Detail around nose may be noted.

Now the third, or rough, layer is made under still higher pressure (about 15 pounds), the wax being deposited in a snowy mass with roughened surface having little nodules. This is for the purpose of giving the layer of plaster, which is to be applied for rigidity, a good hold on the wax impression.

The fourth, or rigid, layer of plaster is now applied thinly to the outer surface of wax with a spatula and allowed to harden (a fast setting plaster may be

used to gain speed). The changes that come about as the plaster sets, of course, are not felt by the patient. Then the impression is removed from the tissues and is washed in cold water (Fig. 4.) Where indicated, a heavy layer of a specially prepared rigid wax can be used instead of plaster for the rigid layer, but this is seldom needed, a thin layer

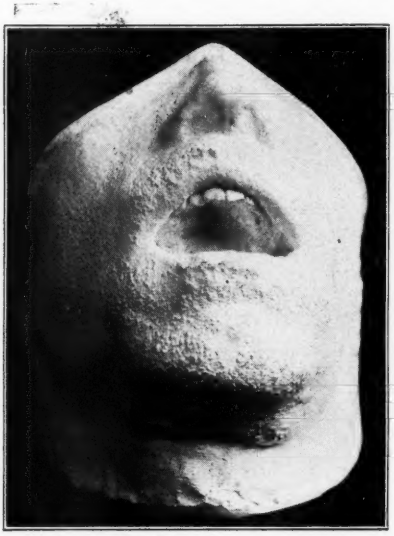

Fig. 9.—Cast taken to demonstrate the distance that we are able to spray into the mouth and the fact that the hair does not interfere in taking the impression, as the patient in this case allowed the beard to grow for several days.

of plaster usually being sufficient. (Fig. 5.) This technic takes far less time than the old plaster method.

The impression is now ready to pour. (Fig. 6.) No separating medium is necessary. Plaster is mixed in a large bowl to a creamy consistency, poured into the impression and allowed to run back into the bowl. This is done several times, until the entire impression is covered, and the plaster begins to set. Then the plaster is poured into the impression to the thickness desired, and allowed to set. By this method, casts of any thickness can be made. A wire loop can be embedded in the plaster at this stage (Monel metal preferred) for suspension, if desired.

SEPARATING THE CAST

Separating is accomplished very easily, and in a few minutes, by placing

Fig. 10.—Case of a very nervous child. The cast was taken in record time and the patient experienced no discomfort. The cast has a gloss finish.

the cast in a large pan with enough water to cover the cast and gradually heating the water to the boiling point. The wax liquefies and the cast is freed of the shell of plaster, which has accomplished its purpose by holding the wax impression rigid. If desired, the cast may be boiled out a second time in clean water. The cast is now finished, with no retouching and no instrument or knife marks, and if the technic has been followed, every detail is shown accurately. The separating of casts

heretofore has always taken much time and work and necessitated great care to prevent ruining the cast with knife or instrument.

Figures 7 and 8 show two cases taken for a surgeon before a plastic operation.

Fig. 11.—The first cast ever made by the wax spray method. The cast has a gloss finish.

They are of interest for the reason that the surgeon required accurate detail around the nose. To secure this with the plaster method is extremely difficult and dangerous because, in efforts to breathe, soft plaster may be sucked into the airways.

Figure 10 illustrates the case of a child who was very nervous and afraid of the dental chair. The cast was taken in record time and the patient experienced no discomfort. The cast has a gloss finish.

Figure 11 shows the first cast ever made by the wax spray method. The cast has a gloss finish.

TINTING

The air brush offers the quickest and easiest means of tinting casts. We can reproduce the natural appearance of the object or tissues, and any abnormal conditions, with astonishing exactness.

SUMMARY

The wax spray method has the following advantages:

In Operative Technic.—1. It is accurate. 2. It is not uncomfortable to the patient. 3. The impression can be taken rapidly. 4. Casts can be taken with safety in cases in which the nose is mutilated. 5. Fine detail can be shown, such as mutilated tissues and scars. 6. Hair does not interfere when the impression is being taken and is reproduced in cast in a natural manner.

In Laboratory Technic.—1. No separating medium required. 2. Separation is rapid. 3. No instrument is necessary in separating, and consequently there is no mutilation. 4. Perfect detail is assured, as the impression is untouched until the cast is completed.

University Club Building.

FAULTY TECHNIC IN INVESTIGATIONS OF THE APICES OF PULPLESS TEETH

By CARL J. GROVE, Ph.G., D.D.S., F.A.C.D., St. Paul, Minnesota

THE results obtained by any method of investigation having a faulty technic are valueless; yet many of the findings presented by bacteriologists regarding the condition of the apices of pulpless teeth are based upon faulty technic.

The mere fact that streptococci can be obtained from the tips cut from pulpless teeth does not prove that such teeth are infectious; neither do these findings prove that the periapical tissue of such teeth are infected.

In cutting off the apical portion of roots, as is done in these experiments, the dentin would, of course, be exposed providing an outlet for bacteria from the dentin, although the cementum covering the dentin may not be infected. It is not possible for bacteria to escape through cementum to the adjacent tissue where the foramen is sealed.

The condition of a root in its original socket is not comparable to the condition produced in these experiments. The root of a tooth in its original socket has cementum covering the entire surface, which will not permit the escape of bacteria. In these experiments, the cementum is cut away with a part of the dentin, and dropped into culture mediums. The growth thus obtained may be from the dentin or the inner portion of the root, and not from the cementum as is implied in the reports made by these investigators. If bacteria are not present in the cementum, such teeth are not infectious when the foramen is sealed.

I do not question that bacteria exist in the periapical tissue of infected pulpless teeth, but I do question that these results are proof that all pulpless teeth harbor streptococci and that all such teeth are infectious.

The fact that bacteria cannot pass from the dentin through the cementum is evidently not recognized by many of these investigators. The assumption seems to be that, if bacteria exist in the dentin, they escape through the cementum to the periapical tissue. The only outlet for bacteria from the dentin to the periapical tissue is through the apical foramen. Since it is experimentally possible to seal off bacteria in a tooth, I believe it can be safely assumed that the same results can be obtained in teeth in the mouth. Under such conditions it is possible, I believe, for infection to exist in the dentin without infection of the periapical tissue following.

It should be remembered that conclusions based upon only one branch of science are often misleading and,

therefore, should never be regarded as final.

Neither clinical observations nor radiographic findings bear out the claim that all pulpless teeth are infected. By microscopic examination of root end tissue, a large percentage of pulpless teeth are found to be free from periapical infection.

With negative radiographic findings in many pulpless teeth, and without systemic manifestations of focal infection, and bearing in mind the fact that the periapical tissue of a large percentage of sectioned pulpless teeth has been found free from infection, it is difficult to understand how anyone can accept results contrary to these findings.

The assertion has been made that lowered resistance of the periodontal membrane results from the removal of the pulp, owing to impaired blood supply following the operation. There is absolutely no foundation for this belief. The fact that the blood supply to the pulp ceases on its removal does not signify that the blood supply to the membrane is altered in the least.

The pulp does not extend through the foramen into the membrane as is believed by some. It ends in the apical portion of the root canal with the periodontal membrane folding into the foramen to meet the pulp tissue.

I have often shown photomicrographs of cementum laid down to close the foramen where this tissue is left in pulp removal and where fibrous tissue is sometimes produced in place of cementum. These conditions are, I believe, equal in resistance to periapical tissue of teeth with vital pulp. The periodontal membrane covers and is attached to the cementum laid down in the foramen in the same manner as on other portions of the root. It also contributes nutrition to this newly formed cementum. Since this cementum has the same histologic characteristics that the other cementum has, it should have the same qualities in other respects.

A REPORT CONCERNING THE ETIOLOGY OF DENTAL CARIES*

By H. E. FRIESELL, D.D.S., and C. C. VOGT, Pittsburgh, Pennsylvania

ACTION OF DILUTE ACIDS ON THE ENAMEL OF THE TEETH

SEVERAL investigators have shown that lactic acid solutions containing 1 part acid to 20,000 parts of water will soften the enamel of a tooth to some extent in three or four days, but no tests have been reported in which the concentrations of acid are comparable to those usually found in saliva, which is normally either practically neutral or only very slightly acid. In the experiments referred to, the acid solutions used were not stirred or kept in motion constantly, so that fresh portions of acid would be brought continuously in contact with the surfaces of enamel exposed to its action.

Studies of this kind give considerable information regarding the action of acids on enamel, but it seems preferable to conduct tests in which the solutions are made to flow slowly over the tooth, thus simulating to a greater degree the conditions in the mouth, where saliva continuously bathes the teeth. Therefore, an apparatus which would permit the flowing of dilute acid solutions over the tooth was constructed. The rate of flow approximated that of the secretion of saliva, i. e., about 1 liter per day. This rate of flow is so slow that, while the solution is constantly renewed in the vicinity of the tooth, there is no danger of wear on the tooth by any mechanical action of the solution itself.

The apparatus consisted of a 7-liter reservoir bottle containing the solution under test. This bottle was connected by a siphon tube to a 50 c.c. Erlenmeyer flask, fitted with a two-hole rubber stopper. The end of the siphon tube reached to the bottom of the flask, so that there could not be any mechanical action of the solution on the tooth. An outflow tube was placed about two-thirds of the distance to the top of the flask so that the excess solution was allowed to flow out continuously, a constant level being thus maintained in the flask. Such an arrangement permits the gradual renewal of the acid solution in a manner that does not produce any mechanical effects, but does insure complete freedom of action by the acid on the enamel by continuously bathing the enamel surfaces with fresh portions of the acid solution.

The first set of experiments was made on the action of water saturated with carbonic acid gas on tooth enamel.

*Read before the Section on Histology, Physiology, Pathology, Bacteriology and Chemistry (Research) at the Sixty-Seventh Annual Session of the American Dental Association, Louisville, Ky., Sept. 23, 1925.

It was found that when water fully carbonated at atmospheric pressure was permitted to flow slowly over the enamel surface of a tooth for two days, several opaque white spots appeared that suggested very definite etching action. At the end of the third day, the entire surface of the enamel was opaque, which indicated very rapid action. To be sure, these teeth did not have the protective action due to the presence of saliva; nevertheless, the quantity of etching produced was surprisingly large, much greater than that found in the non-flow method of testing, reports of which have appeared from time to time in dental literature. In all the experiments described in this communication, the roots were coated with paraffin, so that only the enamel of the tooth was exposed to the action of the reagent.

Other studies by the flow method were made on the action of very dilute citric and lactic acid solutions on tooth enamel. The solutions were made with distilled water through which carbon dioxid free air had been allowed to bubble for at least twelve hours; hence they were practically carbon dioxid free. These solutions were as dilute as 1 part acid to from 1,100,000 to 1,400,000 parts water. Other more concentrated solutions were also used, 1 part acid to from 500,000 to 700,000 parts water, and 1 part acid to from 110,000 to 140,000 parts water. These concentrations of acid were chosen because they approximate those found in saliva itself. For example, the 1 part lactic acid to 1,100,000 parts water solution has a p_H of approximately 6.6, a degree of acidity often encountered in saliva. The term p_H has been adopted as a convenient method for expressing the concentration of hydrogen ion, and it will be remembered that ionic hydrogen is the substance which imparts to acids their characteristic properties.

By physicochemical methods, it has been shown that one liter of pure distilled water contains one ten-millionth gram of hydrogen ion. Expressed mathematically, this concentration is equal to $\frac{1}{10,000,000}$ or $\frac{1}{10^7}$ or, to avoid fractions, 1×10^{-7}. This is the neutral point, where a substance or a solution is neither acid nor alkaline in its reaction. In order to avoid the repetition of the term 1×10^{-x} in expressing acidity, biologic chemists have agreed to make use of only the index number "x" as indicative of the hydrogen ion concentration. Thus, $p_H = 7$ means that the hydrogen ion concentration of that solution is equal to 1×10^{-7} or $\frac{1}{10,000,000}$, i. e., it contains a ten-millionth gram of hydrogen ion in 1 liter. $p_H = 6$ means that the hydrogen ion concentration of that solution is equal to 1×10^{-6}, or $\frac{1}{1,000,000}$, or that there is 1 millionth gram of hydrogen ion in 1 liter, which is ten times the hydrogen ion concentration of a solution with $p_H = 7$. Hence, a solution with $p_H = 6$ is ten times as acid as one with $p_H = 7$. $p_H = 8$ means that the concentration of hydrogen ion of that solution is 1×10^{-8}, or $\frac{1}{100,000,000}$, which expresses mathematically the fact that there is a one hundred millionth gram of hydrogen ion in 1 liter of one tenth of the hydrogen ion concentration of a solution with $p_H = 7$. Therefore, a solution with $p_H = 8$ is only one tenth as acid as one with $p_H = 7$.

These examples show that since p_H=7 represents the neutral point, all solutions having a p_H less than 7 will be on the acid side of neutrality, while all solutions having a p_H more than 7 will be on the alkaline side of the neutral point.

The quantities of acid or alkali met with in biologic fluids are usually very slight—most of these fluids being neutral or nearly neutral—so that the p_H range is limited. This method of expressing the acidity of solutions has come to be the usual one in biologic chemistry, dentistry, medicine and related sciences.

In every case, by the end of six weeks, a definite etching of the enamel was observed. Etching of the enamel of teeth by solutions of acid concentrations comparable to those found in saliva is particularly interesting since it throws additional light on the susceptibility of enamel to the action of very dilute acids, when fresh portions of acid are brought continuously into contact with the enamel.

The enamel of teeth was also exposed to the action of pure distilled water freed from carbon dioxid by the method described above. It was found at the end of eight weeks that opaque spots had been formed on the enamel, which indicated some solvent action by water.

Sample teeth from all these treatments were stained with silver nitrate, sectioned and examined. In every case, the white opaque spots stained more deeply and in the sections had the same appearance as a stained section of a tooth where there is an area of the first stage of dental caries.

These "flow method" experiments were made during the progress of some work on the chemistry of dental caries, and the results obtained were so striking that they seemed worth recording. To be sure, no saliva was present so that its protective action would be available, but the continuous slow solvent action of dilute acids and of water on tooth enamel merits some consideration.

One might form the hypothesis that when the saliva, which bathes the teeth continuously, is unsaturated with respect to calcium and phosphate, it has the power to dissolve some of the calcium phosphate from the enamel of the tooth, thus producing some very slight etching of its surface. Experimental proof for this hypothesis is lacking, but it certainly is reasonable to assume that there must be some close relationship between the composition of saliva and oral conditions.

NOTE ON THE DEGREE OF ALKALINITY OF THE SALIVA OF PREGNANT WOMEN

During the course of the research on the etiology of dental caries, in which the School of Dentistry of the University of Pittsburgh is cooperating with Mellon Institute, a study of the relation which the composition of saliva bears to oral conditions has been undertaken.

The following general plan of attack has been adopted: A careful examination of the teeth and mouth is made and recorded by a member of the clinical staff of the School of Dentistry. A sample of saliva is then taken for the determination of cal-

cium and phosphorus. A p_H determination by a slight modification of the colorimetric method described by Starr[1] is also made of fresh saliva, as soon as it is collected.

The work as planned includes the study of the saliva and the oral conditions of both children and adults. As considerable trouble with the teeth occurs during pregnancy, especial attention is being accorded to the composition of the saliva and to the general oral conditions of gestating women.

Through the courtesy of the department of obstetrics of the School of Medicine of the University of Pittsburgh, arrangements have been made to examine the mouths of some of the clinic patients at Magee Maternity Hospital. Ample opportunity is afforded for the compilation of complete case histories of these patients.

While, as yet, it is too early to arrive at any definite generalizations from the results of these salivary analyses, it is of interest to call attention to the observations made up to this time on the degree of alkalinity of saliva of pregnant women whose mouths have been examined.

The p_H of the saliva of ninety-seven gestating women has been determined, and only eight samples showed a p_H of 6.8 or above, while the remaining eighty-nine had a p_H of 6.7 or below. The average p_H of the ninety-seven samples was 6.61, a figure practically 0.2 lower than the average figure of approximately 6.8 obtained on samples of saliva from various types of individuals, but not from pregnant women.

Whether the slightly higher acidity of saliva has anything to do with the incidence of dental caries is an open question, but, at any rate, the observations referred to seem worthy of record. It is to be understood that this is merely a preliminary note, and that, at a later date, the results of further research will possibly necessitate its revision.

1. Starr, H. E.: J. Biol. Chem., 54: 43-54, 55-64 (Sept.) 1922.

THE THREE FUNDAMENTAL REASONS FOR FAILURE OF FILLINGS*

By RALPH R. BYRNES, D.D.S., F.A.C.D., Atlanta, Georgia

NO truly scientific nor lasting prosecution of the filling of cavities in teeth can be accomplished without a full knowledge of the histology of the hard tissues of the teeth, the pathology of decay and the mechanics involved in preparing the cavity. These are named in the logical order in which they are met and should be dealt with. Too often, mechanics are considered to the exclusion, or the immature consideration of, the first two. The development of these three fundamentals must here be brief.

Enamel is composed of fibers held together by an intervening cement substance. The enamel rods, in turn, are made up of globules or little balls, held in rows or lines. This arrangement can best be likened, in a gross way, to the result obtained by stacking small balls of putty, or soft clay, one upon another, and applying just pressure enough to make them flatten at their points of contact sufficiently to permit of their standing alone. If, now, several of these stacks or columns are placed in close contact, some idea can be obtained of the structure of the enamel.

The enamel rods are stronger than the cement substance which binds them together, so that, when broken or cut, the enamel is inclined to split along its line of cleavage. This is a characteristic which should be taken advantage of and may prove a great time saver.

Figure 1 shows enamel with straight parallel rods. The easy cleavage of this with the cutting instruments can be readily imagined.

Figure 2 represents enamel showing in the outer portion the rods regularly striated, and in the inner one-half or two-thirds the rods intertwined, gnarled and twisted among each other. This which has been denoted by Black as curled enamel, does not yield to cleavage.

It is surprising to what extent the general rule applies that "the direction of the enamel rods is from the center of the crown of the tooth toward the surface," or, to modify this for practical purposes, the enamel rods are most commonly at right angles to the surface on which they are found. In every tooth, however, there are certain portions in which the enamel rods approach the surface at more or less of an inclination from such a perpendicular.

Figure 3 represents a central perpendicular section through an incisor tooth. The enamel rods are cut parallel with their length in all of its parts, but they are not all at right angles to the surface

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of the tooth. They are nearly so in the central portion of both the labial and

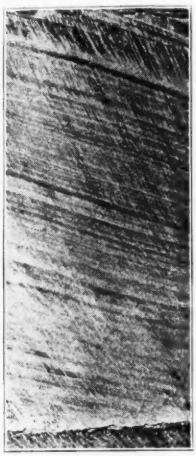

Fig. 1.—Section of enamel with straight parallel rods. (Black.)

the lingual surfaces, but, as we near the incisal edge, there is a sharp inclination

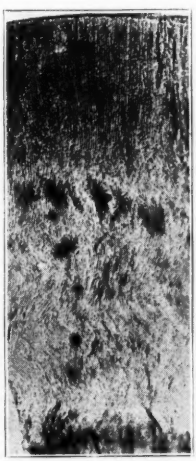

Fig. 2.—Section showing curled enamel, or bundles of rods intertwined. (Black.)

in what would seem to be Nature's effort to so present the ends of the rods as best to withstand the stress of masti-

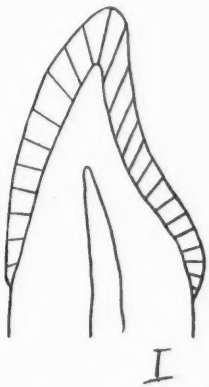

Fig. 3.—Normal directions of enamel rods, upper anterior teeth; central perpendicular labiolingual section. (Black.)

cation or, more properly, incision or biting. Also, as we near the gingival, the inclination of the enamel rods is more pronounced.

Figure 4 represents the central perpendicular section mesiodistally through

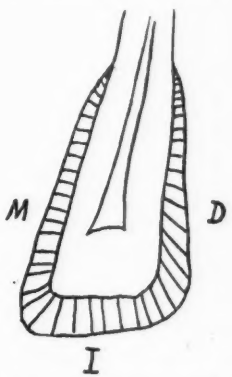

Fig. 4.—Normal directions of enamel rods in a central perpendicular mesiodistal section, upper anterior tooth. (Byrnes.)

the same tooth (Fig. 3). The enamel rods again will be cut parallel with their length, but they all will not stand at right angles to the surface of the tooth. The deviation will be most marked as the incisal angle is reached, and the inclination will be more rapid at the disto-incisal than at the mesio-incisal. This is most pronounced in the lateral incisor and, in its application to cavity preparation, means that proximal cavities may be laid nearer the incisal angle on the mesial than on the distal side without removal and restoration of the incisal angle of the tooth. Again, as we near the gingival, the rods incline more rapidly.

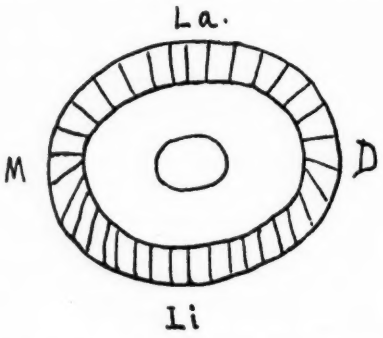

Fig. 5.—Normal directions of enamel rods in a central horizontal section, upper anterior teeth. (Byrnes.)

Figure 5 represents the central horizontal section through the same tooth. The enamel rods are cut parallel with their length, but they all do not stand at right angles to the surface of the tooth. The deviation here is greatest as the axial angles are reached in passing from the proximal to the lingual surfaces. This, interpreted in its application to cavity preparation, means that it is not safe to lay cavity margins at these angles, as the rods probably will be left unsupported. If decay reaches these margins, the cavity must be carried over onto the lingual surface.

Figure 6 represents a central perpendicular section buccolingually through a bicuspid tooth. Here, the enamel rods are cut parallel with their length in all parts of the tooth, but they all do not stand at right angles to the surface of the tooth. They do so most nearly in the central portion of the buccal and lingual surfaces; but, as we near the region of the points of the cusps from both the occlusal and the axial surfaces, we find considerable inclination of the rods toward the points of the cusps, while, in the region of the grooves, we always find the rods inclining in the direction of the grooves. Both of these, again, seem to be the result of Nature's effort to present as strong a front as possible toward the stress of mastication. Also, as we near the gingival, the inclination of the enamel rods always is more pronounced.

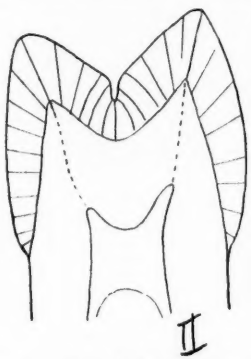

Fig. 6.—Normal directions of enamel rods in a central perpendicular buccolingual section, upper bicuspid tooth. Dotted lines represent recessional lines of the horns of the pulp. (Black.)

The dotted lines extending from the horns of the pulp to the dento-enamel

junction directly under the points of the cusps represent the recessional lines of the pulp as the tooth developed from its earliest to its adult stage. The location of these recessional lines should be carefully studied as it is here that unintentional exposure of the pulp often occurs, for the reason that, in the process of the development of the tooth, this tract is not always completely closed and a slender thread of pulp tissue will often persist in the tract.

Figure 7 represents a central perpendicular section mesiodistally through the

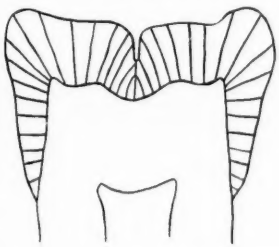

Fig. 7.—Normal directions of enamel rods in a central perpendicular mesiodistal section of a lower molar. (Black.)

lower molar, the enamel rods being cut parallel with their length on the mesial and distal surfaces of the tooth and over the marginal ridges onto the occlusal surface; but here they commence to be cut irregularly diagonally across, in parts of this surface, depending on the relation of the section to the developmental grooves and to the pits.

The direction of the enamel rods, with reference to the manner in which they approach the surface, is about the same in principle as in the bicuspid; that is, at right angles to the surface in the central portion of both the mesial and the distal surfaces, and also in the occlusal surface in the region midway between the groove and the marginal ridges; but as the marginal ridges and grooves are neared, the enamel rods so incline as to present their ends and not their sides to the surface. Also, they incline more rapidly at the gingival. So much for a hasty presentation of the first reason why fillings fail; namely, lack of intimate knowledge of the direction of enamel rods in all parts of each tooth.

With reference to the manner in which teeth decay, there are two great groups, namely, pit and fissure cavities,

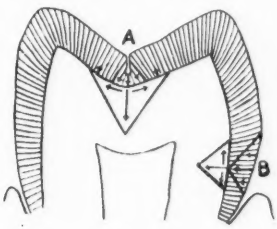

Fig. 8.—Cones of decay (*A*), pit and fissure cavity, and (*B*) smooth surface cavity. (Black.)

and smooth surface cavities. These names are sufficiently explanatory.

Figure 8 is a diagrammatic presentation of a pit and fissure cavity (*A*), and a smooth surface cavity (*B*). Micro-organisms attaching themselves, because of a structural defect at *A*, are prevented from being washed out of this normally clean surface by covering themselves with a gelatinoid substance which makes their hiding place secure, so to speak. Their nest, or nidus, is thus formed, and they grow and multiply. Their acid products dissolve the lime salts, which hold the enamel rods together, and thus form a channel for the progress of the micro-organisms toward the dentin, and a general under-

mining of the enamel beneath the surface occurs. The only evidence on the surface of such a process may be a darkened line in the groove, or a spot in the pit, pressure on which with the cutting instrument may cause the surface to cave in. The process, on reaching the dento-enamel junction, finds less resistance here than in the enamel, and spreads more rapidly. Because of the inclination of the enamel rods toward a groove or pit, we have a cone-shaped area of decay in the enamel here, with its apex toward the surface and its base toward the pulp. The decay in the

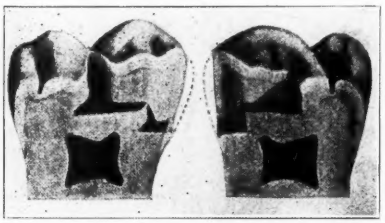

Fig. 9.—A molar tooth with a prepared mesioclusal cavity, split mesiodistally, showing all the internal parts of the cavity. (Black.)

dentin is in the form of a cone with its apex toward the pulp and its base toward the dento-enamel junction. The base of the cone in the dentin is larger than the base of the cone in the enamel, the dentin being softer and permitting of a more rapid spread of the process of decay.

In the preparation of the cavities of the pit and fissure group, it is necessary to remove only the enamel covering the area undermined by caries and form the cavity in the dentin. Further extension for prevention of the recurrence of decay is not necessary, except as it may be required to follow out deep grooves or fissures to places where a smooth margin may be given the filling, or restoration.

Smooth surface cavities, as at *B*, have their beginnings in surfaces that are free from structural defects, and micro-organisms must, therefore, attach themselves to the surface in areas which are more or less hidden from the excursions of the food and saliva, as in the proximal surfaces; and in habitually unclean areas, left so by infrequent and careless use of the toothbrush, as at the gingival of the buccal and labial surfaces.

The micro-organisms here again collect and cover themselves with a gelatinoid substance, giving off their acid

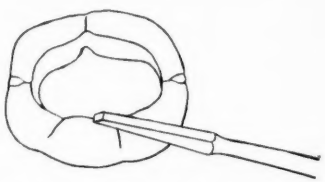

Fig. 10.—Application of chisel to margin of cavity in beveling of the cavosurface angle. (Black.)

products as before, but because of the difference in the inclination of the enamel rods as compared with those at *A*, the decay spreads laterally on the surface, penetrating in the line of the length of the enamel rods. This gives a conical area of decay, the base of the cone being at the surface, with the apex directed toward the pulp, or just the reverse of the process at *A*. In the dentin, the progress of the decay is identical.

The extension for prevention of a smooth surface cavity is so necessary that the rule should be to cut the cavities close to the axial angles, but never past them, the angles being areas of natural immunity.

So much for the difference in the

methods of the spread of decay in pit and fissure cavities and in smooth surface cavities. And here we have the second reason why fillings fail; namely, lack of an intimate knowledge of the different characteristics in these two methods of decay, and failure immediately so to classify each cavity presented for treatment.

The third fundamental—mechanics—is so extensive in its details, and yet so simple in its application, that it is nearly impossible to present it here except in the abstract.

A cavity must be classified, first, as to the group of decay to which it belongs, and, secondly, as to its treatment as a simple or complex cavity. Next, as far as practicable, a mental picture must be formed of the finished product and then work commenced along the lines which will most quickly and effectually assure the desired results. This does not mean that, on opening the cavity more widely, surprises do not await the operator and a change of treatment be indicated, but, to be an intelligent operator, one must know before he starts what he wants to do.

Figure 9 illustrates the fact that parallel walls, cut at right angles to the floor of the cavity with sharp and definite angles wherever wall joins floor, must stand out as preeminently necessary. That the floor be flat and placed at right angles to the stress of mastication, where applicable, is most important.

In complex cavities, the floor and gingival wall should be on parallel planes, and the axial wall of the cavity connecting the two should be at right angles to each, wherever practicable. Parallel walls obtain for the operator frictional resistance, a most important principle to be taken advantage of.

Beveling of the cavosurface angle and the attendant evils resultant on its omission are, of course, most important. (Fig. 10.)

Disregard for these basic mechanical principles present the third and last of the fundamental reasons for the failure of fillings.

100 North Butler St.

DISCUSSION

R. C. Seibert, St. Louis, Mo.: A lack of knowledge of the three fundamental reasons for failures of fillings mentioned by Dr. Byrnes is, in my estimation, a very common cause of these failures. It is indeed important that the operator know the histology of the hard tissues, the pathology of decay and the mechanics involved in cavity preparation; but it is equally necessary that, besides the execution of perfect cavity preparation according to histologic and mechanical requirements, he should know the etiologic factors of decay, and the manipulation of properly selected materials in each operation, in which the final result should be an airtight homogeneous mass which will not change physically under the deteriorating elements found in the mouth. The causes of decay we know are numerous, the effect of acid secretions from bacterial agents which are held in place by gelatinoid masses on rough surfaces or other points of vantage, a condition which indicates certain abnormalities. How long will the most perfect filling last when due consideration has been given to the fundamentals mentioned by Dr. Byrnes, when the laws of Nature are ignored as to diet, masticatory function, healthful exercise or any other thing which reduces the resistance or normal defense, both systemically or orally of that particular individual? How many times do we see cavities well prepared and filled with inlays foil, porcelain, silicates or amalgam, where the poor manipulation of materials was the main factor in the recurrence of decay of that tooth? Finishing of fillings to an accurate fineness, reproducing tooth form and marginal perfection without overhanging ledges, are also very important, and last, but not least, if the cooperation of the patient cannot be obtained through proper mastication of proper food and the subsequent prophylactic measures carried out in brushing, etc., the reasons mentioned by Dr. Byrnes do not fully remove the causes for failures of fillings.

John V. Conzett, Dubuque, Iowa: There are two reasons for recurrent decay: the recurrent decay caused by a failure of extension and failure of the management of enamel margins, and infiltration decay. The first is caused by failure to properly prepare the cavity; the second, by failure to properly manipulate the filling material. Dr. Byrnes did not attempt to enter into the problem of the second class. He only took the first class, and his preparation of the enamel margins is ideal, following the splendid work of Dr. Black in 1891. The management of enamel margin is one of the most important things in the preparation of cavities. The diagrammatic presentation of the enamel margin this morning was splendid. There was one thing that he did not emphasize, perhaps, because of lack of time, and that is that in all pits and sulci, the margins of the enamel rods incline toward the cavities so that in a small cavity it is not necessary to cut very far from the margins of the pits or from the sulci, because of the inclination of the enamel rods toward the cavity, but the farther we get away from the pit, or the sulcus, the greater must be the inclination of the cavosurface angle in order to protect the enamel rods, because the inclination there, of the enamel rods, as you will find from his illustration, begins toward the apex, and when we approach the apex, the crest of the enamel cusp, then we must go beyond the cusp. The nearer we approach the cusp, the greater must be the cavosurface angle. The nearer the pit and the nearer the sulcus, the less the necessity for so great an angle of the cavosurface. A study of the enamel margins is first in the preparation of cavities. No matter how well the cavity may be prepared, no matter how perfectly a filling may be condensed, if the enamel margin has not been properly prepared, the filling is bound to be a failure. I was impressed by something which Dr. Rinehart said in his discussion of the first paper, that is, the laying of the enamel margin under the free margin of the gum. It is necessary, for the protection of the filling, to lay the margin of the filling below the gum, because, as Dr. Black pointed out, we do not have recurrent decay under healthy gum tissue. Gum tissue remains healthy only if the filling material has been properly adapted and properly polished at that point, so that if the enamel margin is not properly made and if the filling is not properly condensed and properly finished at this point, we are going to have a failure.

Dr. Byrnes (closing): I want to thank Dr. Seibert for calling attention to the fundamentals which I recognize. However, if these fundamentals were excluded and those mentioned by him only were used, I fear for the success of the filling. I should like very much to have forestalled Dr. Conzett in directing attention to the difference in the inclination of the enamel rods of the pit and fissure class, which could have been so readily explained in the slide on the bicuspid, if I had had the time. One of the star examination questions of mine for years has been, "In omitting to bevel the cavosurface angle of a pit cavity on the occlusal of a molar, in which is it more serious, a large cavity or a small cavity?" So you see that that point is well covered in my consideration of the subject.

SUPPLEMENTAL GROWTH IN THE MANDIBLE AS A RESULT OF ORTHODONTIC TREATMENT*

By HARRY E. KELSEY, D.D.S., F.A.C.D., Baltimore, Maryland

MUCH has been claimed during the past twenty years by various writers in connection with the artificial development of the mandible and maxilla as a direct response to orthodontic treatment. More recently, enough has appeared to controvert these claims to make it worth while to reconsider the subject, and, if possible, to start an investigation in the hope of securing new data and correlating the old in such a way as to give us more definite knowledge on which to base our future orthodontic prognosis and treatment.

It is not the purpose of this paper, therefore, to attempt to establish one side or other of the question finally, notwithstanding the fact that I have convictions that I believe are well sustained by the researches of many eminent men on bone development, and by the visible evidence supplied by the results obtained in orthodontic treatment of cases in which there was subnormal development of the mandible before treatment. Rather, it is purposed to offer some evidence in support of the theory, long held by me, that there is at least an observable development, an increase in size, of the maxillary bones and that this is sufficient in many cases to permit of obtaining by means of orthodontic treatment results which could not otherwise be secured. It is, then, in practice, a question of the degree of growth that may be induced. I believe that this varies in different individuals, who also offer similar contrasts in their reaction to drugs or in their general physical response to athletic training. Some are sluggish, others respond readily, and often the only way to determine the reaction is by treating the individual. It is probably true that those who believe that orthodontic stimulation of the mandible will produce a new growth, at least in the patient who has not entirely passed the developmental period, and those who believe the opposite, are basing their claims on extreme cases, and are viewing the subject from one side only, the one that has happened to impress them the most. A number of failures, at or near the same time, to produce the required jaw development for the retention and even alinement of all the thirty-two teeth has no doubt often led the unfortunate practitioner to believe that the maxillary bones do not respond to artificial stimuli, and, in his disappointment, he overlooks not only the many cases that have at some other time

*Read before the Section on Orthodontia and Periodontia at the Sixty-Seventh Annual Session of the American Dental Association, Louisville, Ky., Sept. 23, 1925.

responded well to orthodontic stimulation and did provide room for all the thirty-two teeth in good occlusion, but also the many more that showed varying degrees of development.

On the other hand, those who have become enthusiastic over a fortunate series of cases have sometimes come to believe that bone growth and development is only limited by the skill and patience of the operator and his patient, and that if failure results during orthodontic treatment, it is due to faulty treatment, rather than to the fact that, in the particular case in question, the patient does not respond so well, and cannot be made under any circumstances to respond so well, as did the others. Papers on the positive side of the question have appeared with reasonable regularity, and many reports of cases have also been given with the idea of supporting the theory of supplemental development; while, in a few instances, others have been given that were intended to demonstrate the opposite.

Dr. Axel F. Lundstrom,[1] of Stockholm, has, in the last few years, perhaps more strongly than any other, sustained the latter theory. His conviction, for the support of which he draws from the published expressions of a host of well known orthodontists and other scientists, seems to be that the maxillary bone proper, exclusive of the alveolar process, is incapable of reacting to artificial stimulation, intended to induce supplemental growth, and that if growth takes place during or subsequent to orthodontic treatment, it is not due to the treatment but to the inherent possibility of further development in this particular case. He refers to the bone proper as the apical base, and his classic presentation of the subject will long remain one of the strongest arguments in support of its premises.

But I reiterate here my belief that close observation will show that those cases which are said to prove that supplemental development due to artificial stimulation does not take place really do not prove this, but may prove that it does not take place to a sufficient degree to enable the operator to bring all of the teeth into a satisfactory functional occlusion. There are undoubtedly those cases which fail because of the faulty technic or lack of cooperation of the patient. This is inevitable. On the other hand, there are cases that will not respond to any treatment sufficiently to permit retention of the third molars. Yet these cases do respond to a degree, with proper treatment; for in many of them, sufficient development is not attained to provide space for even the second molars without orthodontic treatment. Lundstrom, fortifying his assertion again by the expressions of many orthodontists, concludes that function has, if any, at least very little influence on the development of the maxillary bone. Yet there is much evidence that an individual who is normal in other respects will generally attain a normal development of the maxillary bones, if they are subjected to normal functional activity from infancy to maturity. This development may be inhibited by other retarding factors in some cases in which function may have been thought to be normal, but in such cases the lack of development must be ascribed to those factors and not be said

1. Lundstrom, A. F.: Malocclusion of the Teeth Regarded as a Problem in Connection with the Apical Base, Swedish Dental Journal.

to prove that function does not develop an organ.

Some of the factors that retard development are known and recognized, others are known, but frequently not recognized in our diagnosis, and we are all aware that there are others that are not known, and are still the X quantity of our etiology. Even if it were true that only a percentage of cases were capable of any supplemental development, we should still have to resort to experimental treatment to find out which they are. We can treat our cases only as they come to us, securing the best results that the developmental capacity of the patient will make possible, and if these fall short of 100 per cent space for the thirty-two teeth, as is often the case, something must be sacrificed. No case can be said to be complete until the third molar problem is answered, and the old method of treating a case for a flat fee led to much discouragement and much dissatisfaction, as many cases that were completed for the second molar period were disorganized by the eruptive forces of the third molars.

The treatment that is required by a 7, 8 or 9 year old child may extend over six months to two years, but cannot give the assurance that further treatment may not be needed, and that further space demands may not be made by the development and eruption of the second and third molars. It would seem to be a more rational method (I have for some time pursued it) to treat such abnormal conditions as are apparent when the patient comes in, and do nothing more until a need for further treatment is exhibited. In many cases, some form of retention may be used for a while after the first treatment is concluded to combat the effects the source of which may still be present, but frequently this can and should be dispensed with. There is no doubt that treatment is often carried on which actually antagonizes, or at least restrains, the periodic developmental impulses of Nature, which will do more for the patient for the period of some months, or even longer, than the best treatment.

I believe that, after full maturity, little if anything can be expected in the development of the maxillary bone or apical base, by any method the orthodontist has at his disposal, but I do believe that, with more powerful appli-

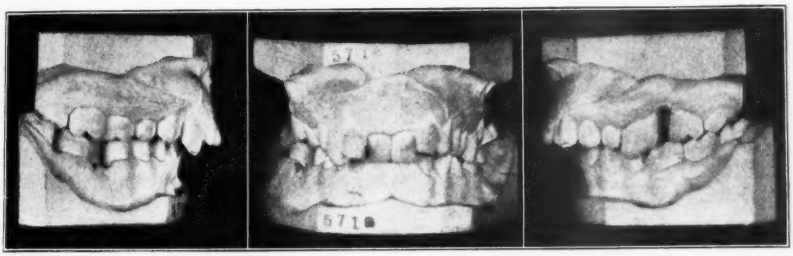

Fig. 1 (Case 1).—Casts showing malocclusion caused by fours years' treatment for spondylitis with an orthopedic appliance having a sling passing under the chin to keep the head up and back.

ances, if they could be used, its shape, if not its size, might be altered at any time of life. This has been demonstrated by the application of appliances for the treatment of spinal defects. Such cases have been reported, in which severe deformity of the mandible and malocclusion of the teeth were brought about by powerful pressure placed on the point of the chin and under the jaw to keep the head up and back.

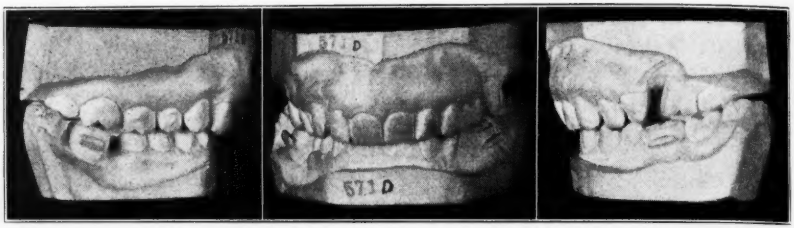

Fig. 2 (Case 1).—Casts of case after orthodontic treatment. The result is not ideal, but was a source of great satisfaction to the patient.

REPORT OF CASES

CASE 1 (Figs. 1 and 2): The patient was treated by me, correction being induced by an apparatus such as is described in the preceding paragraph, worn for a period of three or four years. A similar case was reported by Dr. G. Lind,[2] of Amsterdam. Both these cases show marked alteration in the shape of the mandible and consequent change in relation of upper and lower teeth, though no appliance had been worn on the teeth. The change then was not due to pressure exerted on the alveolus through the teeth, but to influences which acted directly on the mandible or the apical base; which proves that the mandible can be changed both in form and size by artificial pressure.

Fig. 3 (Case 2).—Extreme lack of mandibular development and facial deformity resulting from ankylosis of the jaw.

2. Lind, G.: Deformity of the Jaw Caused by the Extension Bandage in the Treatment of Spondylitis, Dent. Cosmos, 55: 13 (Jan.) 1913.

CASE 2 (Figs. 3 and 6): There was present a marked deformity, characterized by extreme lack of development of the lower jaw, and consequent distal occlusion, which resulted from ankylosis of the temporomandibular joint from infancy to about 13 years of age.

CASE 3: In this case, previously reported,[3] treatment was not begun for several months after successful operation on the joints, and though function, as far as opening and closing the jaw, was fully restored, there was no greater growth in the mandible itself than in

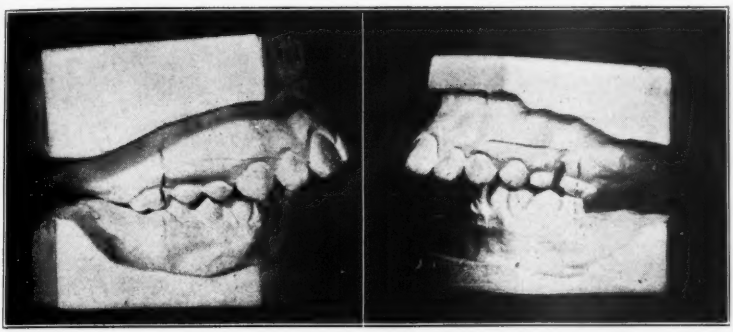

Fig. 4 (Case 2).—Casts of dental arches before treatment.

Two operations on the joints finally released the jaw sufficiently to permit of taking impressions, and three years of orthodontic treatment since then has induced a considerable development of the jaw, as well as a restoration of the occlusion. Function in this case is not so fully restored as in the succeeding one, and, owing to this fact, there has been less development of the jaw than there would

all the other bony structures, because the jaw was functioning and would continue to function in the faulty relation to the upper, which it then occupied. There was, however, an immediate and continuous response to orthodontic treatment, and a sufficient development of the mandible was secured to make possible an excellent and almost normal occlusion of the teeth, and to improve the appearance suffi-

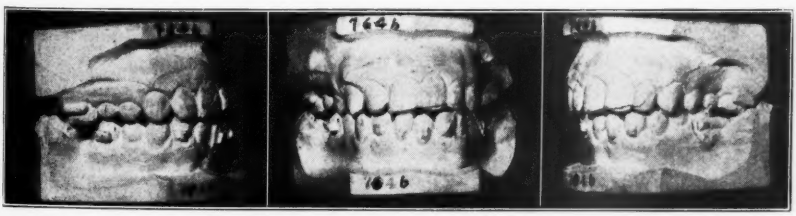

Fig. 5 (Case 2).—Casts of dental arches after treatment.

otherwise have been. Yet, even at this stage of the treatment, there has been enough to repay the patient, surgeon and orthodontist for their efforts. Some of the improvement in occlusion has been brought about by changes in the alveolus, but it would have been impossible to restore the occlusion as it is without considerable supplemental development of the mandible.

ciently to enable the patient to lead a perfectly normal and successful social and

3. Kelsey, H. E.: Treatment of a "Class 2, Division 1" Case Induced by Ankylosis of the Jaw, Dent. Cosmos, 57: 1263 (Nov.) 1915; Orthodontic Treatment of Cleft Palate, Together with Report of Cases, 65: 1 (June) 1923.

business life. When years of normal functional development have been lost, a complete compensation cannot be expected from any treatment, but this must not deter us from getting all we can.

The following quotation is from Koch's Laws of Bone Architecture:[4]

If the mechanical structure of the normal femur is shown to conform closely to the mathematical proportions of a structure of similar shape and physical properties, economically designed to resist the action of loads similar in amount and manner of application, it is conclusive that the structure of the femur is based upon exact mathematical laws: and further, that this is the general law of bone architecture. The form of bone is adapted to its functions.[4]

If the external form and inner architecture of normal bone represent the adaptation to normal function only, then alterations in the static demands made upon the bones must be followed by corresponding changes in both their internal and external structure. Such a transformation of structure would produce deformity if the changed static conditions were sufficiently large to produce a marked change of contour of the normal bone, or to cause a displacement from the natural normal position. Such changes of contour or displacement from the normal must be regarded as a physiological adaption of the structure to pathological mechanical conditions and therefore to "pathological function."

The doctrine of the functional form of bone, with its corollary of the functional pathogenesis of deformity has been ably set forth by Julius Wolff.[5]

SUMMARY[6]

1. The inner structure and external form of human bone are closely adapted to the mechanical conditions existing at every point in the bone.

2. The inner architecture of normal bone is determined by the definite and exact requirements of mathematical and mechanical laws to produce a maximum of strength with a minimum of material.

Further, the observations here recorded for the femur, the largest and heaviest bone of the body, must, in a general way, hold true for all the bones of the body, else we must reach the absurd conclusion that the structure of the femur is in conformity with mechanical laws and that of the other bones is based upon other unknown laws. The numerous ex-

Fig. 6 (Case 2).—Changes in facial line, the result of treatment. The patient is still under treatment.

4. Koch, John C.: Laws of Bone Architecture, Am. J. Anat., Vol. 21, 1917.

5. Footnote 4, p. 180.

6. Footnote 4, p. 273.

periments by Rauber and Messerer in testing human bone have shown that the physical properties of all the larger bones of the body are substantially the same. Hence, the laws formulated above for the femur must, in general, hold for all the bones of the body.

Dr. Hugh W. MacMillan,[7] also emphasizes this point when he says, "The alveolar process needs no special nomenclature, no special embryology, no special histology, no special pathology. It is the most beautiful illustration that bone is a 'living plastic material which is molded by its position, stresses, and environment.' "

In the writings of Dr. B. W. Weinberger, there is also to be found corroboration of this statement. My views on this subject were presented in a paper read before the Pennsylvania State Dental Society.[8]

Dr. George W. Grieve,[9] of Toronto, has become a strong advocate of the theory that supplemental growth of the mandible can be secured by means of proper orthodontic treatment. His belief is based upon the results he has secured in his own practice, and which he has reported on several occasions, most fully at the meeting of the American Society of Orthodontists in Atlanta, last year. In replying to a letter asking for his views on the subject, he wrote as follows:

I outlined in my paper at Washington, two or three years ago, the possibility of getting growth in the main body of the mandible by use of individual planes upon maxillary central incisors, in cases where vertical growth was desired in the posterior region. I stipulated, then, that these planes in order to get this growth must be as steep as it is possible to use them, which I said would be approximately 28 degrees from the long axis of the teeth. Further work along this line enabled me to develop the buccal planes, which would be applicable in cases with normal overbite. The planes, when used in the posterior region, are ordinarily attached to the first molars, and they, too, must be steep, about the same angle, 28 degrees. You could understand that if these planes in the posterior region were constructed so that they were somewhat flat, the teeth carrying them would be depressed in spite of you. I find that the buccal planes are much more definite in their action than those upon the incisors, and I think they should really be used in all cases, possibly not always at the commencement, in those cases requiring development (vertical) in the posterior region. It is important that the full forward placement of the mandible be obtained when setting these planes, in order that you will get absolutely normal mesio-distal locking of the cusps: the planes on each side being set independent of the opposite side; that is, you should set them so you get absolutely normal mesio-distal locking of the cusps on your molars. I think, if anything, it is wise to have a little to spare: that is, have your mandibular teeth a tiny bit forward of your maxillary teeth, if any.

When these planes are placed, you "jump the bite" as Kingsley did, but you must have an appliance attached to nearly all the teeth, so that you absolutely prevent any tipping. In this way, you get the maximum anchorage, and very little if any, movement of the teeth in the maxillae or mandible. With this anchorage, growth takes place without a doubt, and I have lots of cases to prove that when the planes are removed the patients cannot bite the mandible back to its old position. It becomes longer from the condyle to the symphysis; without a doubt, it grows.

If these men have demonstrated that bone does develop in response to mechanical stimuli, and that what is true for

7. MacMillan, H. W.: The Clinical Application of Some Anatomical Facts to Dental and Oral Surgery, Bull. Chicago Dent. Soc. Jan. 21, 1925.

8. Kelsey, H. E.: The Normal Function of the Child Denture in Its Relation to Development of the Jaws and Other Facial Bones and the Preservation of the Teeth, Dent. Cosmos, 57: 178 (Feb.) 1915.

9. Grieve, G. W.: A Definite Method for Stimulating Normal Growth of the Mandible, Proc. Am. Soc. of Orthodontists, 1925.

one bone must be true for all, it follows that the maxillary bones are no exception to the rule, and the development of which they are capable is only a matter of degree. Some respond readily and show a great inherent capacity for extensive supplemental development; others react slowly to stimulation and, with the best efforts, sufficient development cannot be secured for the accommodation of all the teeth. It is our task to carry on investigations which may lead to the discovery of obscure and even unsuspected etiologic factors of malocclusion. Articles appear with reasonable frequency from the pens of enthusiastic students on the subject who believe they have discovered a new factor in the etiologic complex which will overcome the entire discrepancy in our knowledge of the subject. This has never proved to be the case, but if such investigations add even a small amount of knowledge, they are at least of great value, and will sooner or later receive the appreciation that they deserve. They often are so appealing and interesting that many practitioners are induced to accept them as the last word and conduct their cases accordingly; and of course much time is lost and harm sometimes done before the error is sufficiently demonstrated to induce practitioners to put a true value on it. This is often the case when there is an element of truth in the new theory, but must be invariably so when it is all error. Because of this, there is an observable tendency during the last five years to decry most of the theories formerly held, and to denounce them as out of date and old fashioned. Yet it is also observable that many of the people who are constantly telling you that you are all wrong no matter what you profess to believe, go back to their offices and practice the same old orthodontia which they have been practicing for years past, and which is often very good, based as it is on the results of a great number of successes and failures.

We must in the future so broaden our knowledge of etiology that we shall learn to combat known retarding factors and discover others that are not known, and learn also to combat these so that perhaps, in time, we shall be able to practice real prevention or at least measure beforehand the inherent capacity of an individual for development, and plan our treatment accordingly. Until that time, we shall have to go on treating our cases as we best know how, securing the best cooperation we can from the patient, and compromising on ideal results if found necessary, only after we have done all that is possible to secure them, and rarely, if ever, making the compromise in the beginning, with a patient who has still a growing period before him; for as yet we do not know which will respond adequately and which will not.

833 Park Avenue.

DISCUSSION

B. W. Weinberger, New York City: A great deal has been written on this subject, but most of it has been theoretical and not based upon actual scientific work. I cannot find fault with Dr. Kelsey's statements as to the degree of growth that may be induced through artificial stimulation and the fact that the maxillary bones do develop through the proper handling of these cases. It is not quite true that this development is limited only to the skill and patience of the operator and patient. Dr. Kelsey states: "There is much evidence to prove that an individual who is

normal in other respects will generally attain a normal development of the maxillary bones if they are subjected to normal functional activity from infancy to maturity. This development may be inhibited by other retarding factors in some cases where function may have been thought to have been normal, but in such cases the lack of development must be ascribed to those factors and not be said to prove that function does not develop an organ." Among our problems in the treatment of orthodontic cases is the question of growth and how to produce it. When the individual is normal and all factors concerned are likewise, our problem becomes simple, but how often do we find all these circumstances favorable? In but a very few of our cases. Permit me to quote a few paragraphs of a statement by Mendell in a paper of mine.[10] In speaking of the factors which determine the possibility of growth, he says: "The factors which determine the possibility of growth, and upon which, therefore, any broad generalization regarding the abnormalities of growth must be based, may be classed, with respect to the organism involved, as internal or external in character. Perfect growth and development implies a far-reaching correlation of the various parts of the body. An upset in this nicely balanced relationship is speedily recognized an an anomaly. . . . Abnormal growth may involve (1) the correlation feature, or (2) a time factor whereby the characteristic rate of the increase in mass is not maintained. . . . When there is overgrowth in one part or underdevelopment of another, the correlation is upset. This is abnormality. Likewise, when the change of size is well proportioned or correlated, but unduly delayed or prolonged, growth becomes abnormal in its rate for the individual under consideration. It will be noted that the interferences with normal growth may be constitutional, or internal, in some of these manifestations of abnormalities of correlation, and external or seemingly associated with alimentation in other cases. It is not yet possible to distinguish clearly between cause and effect." I am still firmly convinced that when we do have an abnormal development of the mandible, and the latter is retarded in its normal development during embryonic growth, or in infancy, it seldom regains the amount of this mal-development, nor will all this difference be overcome through treatment. No better correlated example could be found than in the case of an individual with hip joint disease and the consequent shortening of the limb. No amount of treatment ever seems to restore the unfortunate limb to the full growth of the normal one. It is this important factor of supplemental growth that I believe most of us have overlooked and that has led us to believe our treatment was due to faulty technic or lack of cooperation of the patient. It is also for this reason that I agree with the essayist when he advocates early treatment, especially correcting such abnormal conditions as are apparent when the patients present themselves, and then additional treatment as time goes on. For the earlier we can combat effects, the more nearly will development be normal, and the less lack of development will be the result and easier to overcome. The nearer to full maturity the individual progress, the greater the extent of the maldevelopment and the greater the difficulty to correct, with the possibility of greater arrested development. Bone does develop in response to mechanical stimuli, but our results depend on the degree of overcoming this arrested development. I do not believe that anyone present disputes the fact that function does not develop an organ. There are too many evidences along anatomic and physiologic lines to question the foregoing part of his statement, but how, is still to be explained. We have been taught that the development of the maxillae depends on the development of the mandible. Permit me to digress a few minutes from the subject of this paper. I will try to show the importance of proper function by presenting a skull that I have in my collection, which I firmly believe will be convincing as far as the dental arches are con-

10. Weinberger, B. W.: Studies of the Position in Utero and Mechanical Disturbances, as Revealed by the Roentgenogram, and Their Probable Etiological Bearing on Dento-Facial Deformities and Malocclusion of the Teeth, Dent. Cosmos, 64: 643 (June) 1922.

cerned. (Fig. 7.) Figure 8 shows a skull of a child a year or two younger, with the mandible in posterior relation to the maxillae. Note the anterior region, which, apparently, without a close examination, is satisfactory, except the open bite, owing to the erupting central incisors. Figure 9 shows the same skull with the mandible brought forward to its correct position, so that the first permanent molars are in proper position. We can now see how clearly the maxillae and remainder of the face have been arrested in development in this case as a result of the improper relationship of the dental arches

Fig. 7.—Average skull of child about 7 or 8 years of age.

and the resultant improper functioning. I should like to call attention to a recent article of Dr. Murk Jansen.[11] His theory deserves thorough consideration at our hands and we might therein find an explanation as to the peculiarities observed in our various undertakings and an answer to our successes and failures in obtaining bone growth in the mandible and maxillae. I am indeed glad to note the statement Dr. Kelsey has made as to those who believe they have discovered new factors in the etiologic complex and which fill up the entire discrepancy of our knowledge of the subject. These investigations add to our knowledge, but time alone will tell whether they prove to be facts or merely other theories. In orthodontia, our etiologic factors are unlimited and the surface so far has but merely been scratched, as proved by the fact that nearly all our previous known theories are beginning to fall, and only time can tell how many will remain on future true scientific investigations. Though orthodontia as heretofore known is old, it is still in its infancy, and a great deal of hard work and study are still required before we will be able to call it a true science. Meanwhile, we must accept those theories until they are proved erroneous. We have within the past few years, as Dr. Kelsey said, begun to broaden our knowledge of etiology, and I believe that in the near future most of the present uncertainties will be satisfactorily cleared up.

Hugh W. MacMillan, Cincinnati, Ohio: The subject of supplemental growth of the mandible as a result of orthodontic treatment is so vast that only the briefest references to it can be made in the time usually allotted to a discussion. In 1888, Koch formulated his law: "Every change in the form and function of the bones or of their function alone is followed by certain definite changes in their internal architecture, and equally definite secondary alterations of their external conformation, in accordance with mathematical laws." Without further discussion, this definition, which is no longer a theory but an established fact, could be offered as indisputable evidence of the changes that follow in the internal architecture and external con-

11. Jansen, Murk: Some of the Life Properties of Bone Substance, Dent. Rec. 45: (June) 1925.

tour of the mandible and maxilla as a result of the new conditions of weight and strain brought about by orthodontic porcedure. The dictum of Wolff has long been accepted by orthopedists as a working basis in the correction and prevention of deformities in other parts of the body. While it by no means covers all the various phases of an individual case, such as age, habit, environment, the presence of deficiency diseases and calcium metabolism, it gives the operator a definite, tangible, mathematical guide for the permanent correction of the deformity and for the prevention of other deformities. Dr. Kelsey, in support of his observations on supplemental growth of the mandible, very aptly quotes from Koch: "Hence the laws formulated above for the femur must hold in general for all the bones of the body." Referring to this quotation: "It is a lamentable fact that more intimate knowledge of the alveolar process is not general. To the orthodontist, the structure and reactions of the alveolar process are of far more importance than the anatomy of the teeth themselves. The teeth are, after all, only agents through which the stresses and strains of mastication are transmitted to the alveolar process. It is the reaction of the alveolar process to the various dental medications and manipulations that spells success or failure for every dental operation. The alveolar process in its various manifestations is the foundation upon which dental art and science is builded. When one hears dental teachers refer to the alveolar process as transitory, evanescent, spongy, poorly nourished, absorbed in whole or in part, unlike true bone, etc., etc., one naturally gains the impression that dental art and science is certainly not builded on a rock foundation but on something even less substantial than shifting sand. An evidence of this misconception of the alveolar process is present in the quotation from Lundstrom, who says that "the maxillary bone proper, exclusive of the alveolar process, is incapable of reacting to artificial stimulation." It would be of distinct benefit to dental science if Lundstrom would define the geographic limits of the alveolar process; wherein it differs in its histologic characteristics from that of the maxilla, and the limits of its adaptation to its environment. Recent studies have shown the cardinal characteristics of its compact and cancellous bone to be indistinguishable from that of similar bone elsewhere in the body. It is impossible, macroscopically and microscopically, to define the boundary between the alveolar process and the remainder of the jaw. The distribution of its compact and cancellous tissue is in direct relation to the mathematical structural requirements of the stresses and strains. In keeping with its functional requirements, it is

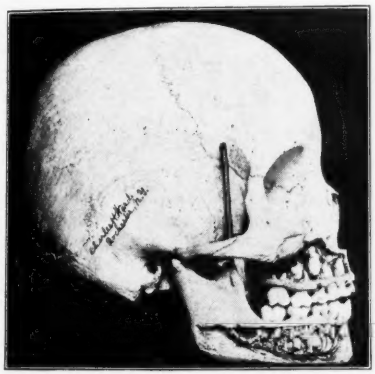

Fig. 8.—Skull with mandible in posterior relation to maxillae.

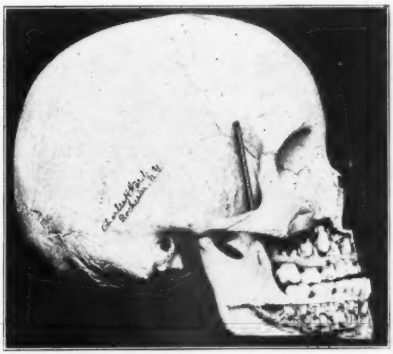

Fig. 9.—Skull shown in Figure 8 with the mandible brought forward to its correct position. The underdeveloped maxillae is a result of improper occlusion and function.

abundantly nourished. Its external contour and internal architecture change to meet new conditions of stress and strain as beautifully as does the femur. Increased closeness of spacing of trabeculae is demonstrable as the result of increased stimulation, and disuse atrophy is equally indelibly imprinted in its physical makeup. One of the most beautiful illustrations of the ability of the maxilla to change its entire structure as the result of orthodontic treatment is the change in the nasal fossa, antrums and roof of the mouth following widening of the maxillary arch. By the simple process of moving the teeth to their correct location, in some mysterious manner these changes in other parts distant from the alveolar process occur. No appliances have been placed in the nasal cavity or even in the roof of the mouth, yet, as the months and years pass by, a normal face is formed. This mysterious force is nothing more or less than the immutable working of Wolff's law, which, expressed in another way, is that "the external contour represents mathematically simply the last curve uniting the ends of the various trajectories which make up the internal structure." A discussion of this kind would hardly be complete without reference to the work of Howell. One of his conclusions is: "The answer to the question whether bone growth is entirely independent of the action of stress and strain is equally definite and also in the negative. This is shown conclusively by the very much smaller diameter, thickness, size of trabeculae and greatly reduced weight of bones largely deprived of the action of mechanical stress and strain." It should be emphasized that stimulation of the growing jaw is obtained only by mastication. The pressure of appliances produces stimulation only indirectly as it changes the lines of stress to which the alveolar process is subjected. The alveolar process records these changes as beautifully as other bones. Since there is no fundamental difference histologically between alveolar process and the base on which it rests, it follows that there must be a rearrangement of this base in accordance with the static demands. In development, in response to stimuli, in regeneration, in any comparison with the remaining osseous tissue, there is no bone which is more characteristic than the alveolar process.

Dr. Kelsey (*closing*): It would be well for every orthodontist to digest thoroughly the statement that development of the maxilla and mandible takes place only as a result of the function of mastication, and that orthodontic treatment simply changes lines of stress, if I understood Dr. MacMillan correctly. The thought is almost new to me and, when properly analyzed in connection with our work, it may prove a valuable addition to our knowledge and our ability to get results. It contains food of immense value for future thought and consideration.

INCISAL GUIDANCE—ITS INFLUENCE IN COMPENSATION AND BALANCE*

By FREDRICK W. FRAHM, A.B., D.D.S., Los Angeles, California

THE most important phase of restorative dentistry is not occlusion as we understand it today, but the functional relationship that exists between the movable and the fixed parts of the masticating apparatus. For the purpose of discussion and study, it does not matter what name or the caption under which we consider the problems that are involved. We may as well say eccentric occlusion or articulation as to employ some other term, and call it the standard for this occasion, since there is no real authority for any of the terms at present in use. Every writer on the subject of intermaxillomandibular relationship seems to feel the urge to coin his own terms and set them up as standard. However reasonable this may be, it does not change a recognized functional relationship of these parts or obviate the necessity of accurate methods of establishing them. With your permission, I shall speak of this dynamic relationship as functional occlusion.

In the study of functional occlusion, we are dealing with problems peculiar and distinctive to each case, and a very important feature of this problem is incisal guidance. The consideration of this guidance is as necessary in the field of orthodontia and pediodontia as it is in prosthesis of either partial or full restorations. There are no twins in this field of corrective and restorative dentistry. Some men would have us believe that every case is so much like every other, that occlusion, either centric, eccentric or functional can be either treated with or established on the basis of a geometrical figure; or that you can develop tissue or functional tolerance to a degree that will enable the patient to masticate with the appliances and not suffer any immediate or remote functional anatomic disturbances.

Those who have given incisal guidance any serious consideration from a strictly scientific aspect, apart from a predetermined arbitrary mechanical device, realize that the mandible is not hung in space without guides or controls, that it moves in harmony with certain laws and is limited in its movements within very definite bounds; that these movements are as peculiar to each individual as is any other part of his being, and that the influence of these guides is reflected in the arrangement of his teeth before extraction and will manifest itself in an aggravated form after some of the teeth have been lost. The periodontist is aware of controlled movements and the stress and trauma caused by a lack of their coordination, and the consequent abrasion of several or all of the teeth, with the resultant injury to their investing tissues. The

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orthodontist constantly faces these forces and factors even after his retaining appliances are on, wondering if the results that he labored months to obtain will be permanent. Perhaps he has been building his arches to conform to an ideal that he chooses to call normal, and that have been obtained without due regard for or consideration of the several functional factors that enter into arch formation or tooth alinement, the most important of which is incisal guidance.

We may be familiar with the physiologic function of all the muscles of mastication and those that indirectly enter into the control of mandibular movement. We may register the direction and amount of stress exerted by each group, or the composite, and yet our work will be only a partial success, if not a failure, owing to the fact that we did not take into account the other factors that influence mandibular movement. We dare not assume that the mandible functions in space. If we did, we could assume that the basic foundation of our work lay within the segment of a sphere of whatever arc or radius within reason. There would not be any problems in the field of prosthesis, and the constructing and placing of our appliances would be simple indeed. A casual observer has some ground for such an assumption when he examines full natural dentures apart from the anatomic factors that control the movements of the masticating unit. However, he will arrive at an entirely different conclusion when some or most of the teeth have been lost in either or both of the arches. The operator who considers only the structural and mechanical factors of his work, without their relationship to the kinematics that are involved in each individual case, is surely inviting failure for his work and disappointment for his patient. Occlusion, by whatever name, apart from individual functional requirements is a delusion and a snare, and many a man has been deceived by it. Likewise, an operator who bases most, if not all, of his conclusions and methods of treatment upon muscle control, without due regard for the type of mandible and the osseous inclined planes and factors that guide it in its movements, cannot hope to succeed in the functional restoration of the masticating unit.

A great deal of thought is being given to the parallelogram of forces and its bearing on the movements of the mandible. As interesting and helpful as this study is to those who study the kinematics that are involved, we must not be misled by it into the belief that such forces control mandibular movements. This force influences only the retruding and closing movements of the mandible. If man were a carnivorous being, we would not have to consider the other two factors; namely, the lateral complex of force exerted by the pterygoids and the osseous and incisal guides. The operator who ignores these, or depends on a method or device that ignores them, is not true to himself or scientific in his methods, and is not faithful to the interests of his patient.

What is science? Science is classified knowledge. Therefore, any man who will not avail himself of all the data that are now available is, to that degree, unscientific. When we consider the vast amount of stored and related knowledge that we now have on the subject of functional occlusion, there is no real excuse for carelessness in denture work.

I do not lay claim to the last word

that is to be written, nor do I set myself up as an authority that cannot be questioned. However, I hope to bring out some correlated facts that have a definite bearing on functional occlusion. I shall try to relate some theories with existing facts and correlate them with the underlying principles of functional occlusion, with emphasis on partial denture work.

There is a theory in present-day prosthesis that the mandible in its movements functions independently of all guides, as though it had a central axis with a 4-inch radius, with the teeth arranged on a section of a sphere with the resultant arcs. This is a beautiful theory; in fact, simplicity itself; but it is not sustained by the facts that every prosthetist must face in his practice.

Lest we forget, let me call your attention to the fact that none of the theories given and proved by Dr. Gysi have been disproved. There are some fixed and immutable truths even in prosthetic dentistry that are as incontrovertible as some in mathematics and chemistry. Some of the present day spherical theories received favor and consideration and were applied with partial success, because the restorations constructed under their dictum rest upon yielding and changing living tissues, with an ability to adapt themselves to conditions that are forced upon them. You may name it tissue tolerance, but I shall call it tissue endurance.

The present-day methods of considering and studying our problems are very irregular and unrelated, if not entirely unscientific. I say unscientific because our present methods of research in prosthesis are purely feudal in character. There are several outstanding men who have made an effort to standardize an order of procedure, but their efforts are unappreciated because they cannot be commercialized. Standardization in diagnosis, technic and treatment would be of inestimable value to teacher, practitioner and patient. Dr. Black's operative methods are an outstanding example of what can be accomplished, if we are willing to let truth prevail instead of personal ambitions. I wish to acknowledge my indebtedness to Dr. Gysi. His accurate and scientific methods of study made a strong appeal to me, compelling me to revise some of my ideas and conceptions of denture work and to study mandibular movements during mastication and speech, as well as in the abstract. These studies, which were conducted over a period of fourteen years and covered several thousand cases, brought to light a variable movement in the incisor region. This movement, however, was always very definite and characteristic of each individual, and it had a variable range within five distinct directions.

A great deal of study was given to rotation points, axis, condyle paths, lateral movements and variable functional centers, while the incisal point of the triangle was ignored. This revealed the impossibility of establishing balanced or functional occlusion, or articulation. It established the fact that we cannot ignore incisal guidance and hope for success with any more assurance than if we ignored condylar guidance. Incisor guidance is the third leg of our three-legged problem. It is just as reasonable to expect success in prosthetic work without considering incisal guidance as it is to expect a stool to stand on two legs. In 1910, I suggested to Dr. Snow that his articulator should be an adjustable one, constructed with an adjustable incisal guide. Ever ready to improve our equipment, he made the Acme

articulator. However, this did not embody my ideas for incisal guidance. At the same time, or perhaps a year later, I made an appeal to the Dentists' Supply Company through their representative for them to construct an adjustable incisal guide. Nothing was done by them, and I was obliged to make one. My friends christened it "The Butterfly." Other adjustable guides have been made since that time, but none of them are adjustable to the five definite positions. Dr. Needles' incisal guide has a range of three positions and is the best device on the market today. However, it should be improved to take care of the other two planes.

Dr. Gysi, in his early work, introduced a definite technic for obtaining the lateral movement of the mandible and built an articulator with that function. There is, however, a lateral movement, during heavy duty mastication that had not been recorded by him. This movement of the mandible is the most efficient and also the most destructive to the retention features and the restoration itself, unless it is carefully considered and provided for. The strain induced by this movement is the nightmare of the orthodontist and the pediodontist. The apparent freedom of the movement will lead men to disregard it; but remember, it is functional, habitual and peculiar to each individual. It cannot be controlled by the law of averages. We divide our problem of incisal guidance into one vertical and two horizontal fields, and coordinate with condylar guidance.

The three inclined units of the vertical field must receive careful attention before any consideration is given to the other factors. The inclination of the condyle paths and the sagittal plane of the incisal guide must coordinate in their downward and forward movement or the discrepancy will have to be taken care of by grinding or undesirable positions of the anterior teeth to provide balance for the incising function. However, such compromise would not permit true guidance when the mandible is used in the forward and slightly lateral movements.

The next important movement is as powerful and important as any that the mandible is capable of making. It is a movement that occurs at right angles to the sagittal plane of the skull and more or less parallel to the occlusal plane. The slightly upward direction of this movement in the condyle region increases as we near the incisal path of the triangle. This movement, which is limited by the discus articularis and the capsular ligaments, is distinct and apart from any movements that are influenced by the condyle paths. The amount and direction of movement is reflected to a greater degree in the incisor region, with a very slight decrease as we reach the third molar. Dr. Gysi, in 1920, gave us the results of his studies in masticating efficiency, showing some of the movements that the mandible is capable of making, but did not call our attention to this powerful, limited, lateral movement, which is not protrusive on one side and lateral on the other, but strictly lateral on both sides.

Dr. J. Leon Williams, in his studies of the geometry of the mandibular movements, gives us a lengthy hypothesis, supporting to a large degree the spherical theory of mandibular movements, with some reservations. I do not agree with such a theory. We cannot have two opposing theories at work at the same time. It must be either the one or the other that controls mandibular movements. A careful study of

a number of incisal tracings parallel with the occlusal plane and then parallel with the sagittal plane of the skull would reveal some interesting things to the advocates of the spherical theory of mandibular movements. Such a conception is a delusion, a mockery, a snare, and the sad part of it all is that some men will take it as the real thing and bring disappointment and grief to their patients. Error is sometimes so nearly like the truth that truth is lost within its folds and blends with it as do the colors of the rainbow. The fact that the functional movements of the mandible seem to have an axis with a radius of from 3½ to 5 inches does not give us license to ignore the factors that control or influence such movements. Truth mixed with error does not do away with the fact that the mandible has definite guiding factors, of which incisal guidance is not the least component.

The freedom and direction of the downward and forward, upward and backward movements of the mandible depend on the condyle path, one component of the incisor guide under the influence of the temporal and masseter, and some auxiliary muscles. While the to and fro movement at an angle to the sagittal plane is controlled by the pterygoid muscles, they depend on the other components of the incisal guide, apart from tooth guidance, for their functional direction. These movements are greater in some individuals and also more destructive. By them, all our restorative appliances are tried and tested, and in them the orthodontist and periodontist have a real foe. We find the force of this movement at work night and day in nervous patients and those who grit their teeth. However, if they are properly guided in the incisor portion of our field by two component controls that harmonize and coordinate with the functional movements of the case, we do not need to concern ourselves about the ultimate results. In fact, if thus controlled, they are the most beneficial force available; but we must establish inclined plane and cusp coordination.

A large portion of failures in bridgework, either fixed or removable, attributed to overloading of the abutments, are directly due to the ignoring of the five components of mandibular guidance. When we establish functional freedom in harmony with condylar and incisal guidance, as required by each type of masticating unit, we will have real success in all our restorations, from a one tooth to a full denture restoration. I deplore the present-day tendency of ignoring fundamentals and then grinding away the cusps and inclined planes with the hope of establishing balanced articulation and removing trauma and strain. Dentures and bridges so treated have little functional value.

It is just as reasonable to expect the mandible to function when we ignore its habitual paths with restorations that are not constructed to coordinate with the several guiding components, as it would be to expect the locomotive to move in a path and reach its destination without the guiding rails. It is quite a common thing to hear a patient say, "The doctor who made this appliance changed (or ruined) my bite." We know this to be a fact and also know the reasons.

What is incisal guidance? What is tooth guidance? In fact, is there any guidance that we may see and handle as we would the rails that guide our transcontinental trains? Or may we

liken it to the radio waves? This we do know: there is a very definite movement in the incisor field that coordinates with other movements. We also know that it is made up of several components, and that these function in coordination with the other components of movement and factors of functional occlusion. Incisal guidance is strictly functional, and does not depend on teeth or tooth guidance or any other guide for the direction of its movements. Its range or limitations depend entirely on the anatomic development of the individual, and is as characteristic as the individual himself. There are no twins here.

Tooth guidance apart from incisal guidance is a huge joke. The latter controls the former, and woe to the tooth or teeth that are out of harmony with it. Such teeth will either become abraded or they will be lost by disease or trauma. Every partial restoration, bridge or otherwise, is a failure unless its tooth guidance coordinates with incisal guidance. If it is made otherwise, a patient may become used to it, or tolerate it after the cusp inclined planes have been reduced. Even then, it becomes a menace to the anchor teeth, owing to the indirect strain of a misdirected force. These flattened occlusal surfaces of our appliances may give functional freedom, but they are very limited in masticating value and will in time wear the natural teeth and cripple the entire masticating unit.

All prosthetic appliances that are constructed on the basis of tooth guidance or of muscular control will prove a mechanical failure and provoke functional disturbances from which the patient will never recover. Tooth positions that are made independently of the several guiding factors of mandibular movements are subject to the law of kinetics and their life and usefulness limited. A careful study of such cases reveals a lack of coordination of the several guiding components that govern mandibular movements. When we are permitted to check the final results in such neglected cases, we may find the occlusal surfaces of the teeth in a series of reverse and alternate curves. Such patients do not complain, since they have acquired a functional and tissue tolerance and a kinetic and kinematic adjustment. That such a thing is possible does not give operators license to take advantage of it, telling their patients that the appliance is all right and that they will have to get used to it.

Dr. C. K. Bird, in discussing this subject, assumes the position that the teeth are only props, which maintain the interrelationship. He makes bold to state that the real solution of our problems and a knowledge of the fundamentals are to be found in a thorough understanding of anatomy, physiology and the Monson theory of occlusion. No doubt he thinks that he has given to prosthetic dentistry a principle as fundamental as that Sir Isaac Newton gave to science.

Incisal guidance in partial work has been neglected too long. Most of the profession has assumed that tooth guidance is sufficient for this kind of restoration. Such a position is functionally wrong. There are few partial cases that do not have impaired function due to migration of teeth, caused by extraction of one or several members of either or both arches. If these cases are not treated at once, and restored to function with a proper regard for the factors that control mandibular movements, the final chapter will soon be written, and we will have an edentulous patient.

This applies with equal force to bridgework, either fixed or removable.

I should not advise the use of any of our present day equipment for the analysis of a natural denture to determine the location and amount of occlusal trauma present in any case. There is not an instrument worthy of a place in the study of traumatic occlusion. I would be willing to consider Hanau's Kinescope if it were equipped with an incisor guide that would be adjustable to five positions.

Functional occlusion, or articulation, is not only influenced but also controlled by the several condylar and incisal guide components and muscular kinetics. However, muscular kinetics, or changes in motion due to force, never control the movements of the mandible. The most important of these factors lie within the incisal guidance field when all the teeth are present. This is due to the change in leverage. During mastication, the mandible is functioning as a lever of the second class most of the time; a lever of the third class a part of the time, and a mixture, or release, in some of the lateral positions.

I shall try to outline the component units of the incisal guide and the functional reason for each. The vertical field must be parallel with the sagittal plane of the skull and permit adjustment from a negative to a positive degree of inclination with the horizontal plane. This will permit any required adjustment to coordinate with the inclines of the condyle paths. This movement is always used during incising if there is no anomalous or functional disturbance present.

In conjunction with this adjustment, we must have a right and left independent angle adjustment that will compensate for the difference in degrees of the condylar inclined planes and the scalene triangle variations of the mandible. The right and left triangles of the masticating unit differ in size, which necessitates an adjustment in the condyle path, or vice versa.

The other, or third, adjustment is to be made on each of the right and left angle wings, in the form of guides for the incisor pin, having a variable horizontal adjustment at an angle to the sagittal plane of the skull. This right and left guide must harmonize with the shifting axis of mastication peculiar to each case. These three adjustments are made up of the five components referred to in this essay.

The first, or compensation, component aids in the control and arc of the compensating curves, and equalizes the altitude variations of the horizontal triangle and the different distances of the plane of occlusion from the temporomandibular articulation. It also aids in the control of the truncated cone.

The second, or right and left, angle component controls the lateral curves and type of arch form. They also aid in compensation and control of the lateral components of the truncated cone, thus giving us balanced articulation during mastication. It is the only component that determines the size and type of the right and left rectangular groove available for each case. It establishes the angle of inclination of the buccolingual inclined planes that bound the rectangular groove above and below. However, these may be rotated within certain limits, producing a vertex with an obtuse angle. This angle increases as we reach the bicuspid region. It rarely becomes greater than a right angle. The difference in the size and type of the right and left sides

of the triangle is compensated for by an increase or decrease in the buccolingual inclination of the teeth or by grinding in ratio with the inclined wings of the incisor guide. Balanced articulation is impossible without careful attention to the right and left wing adjustment. Resorption of the bony ridges under our appliances will not take place if these components have been adjusted to the physiologic requirements of the case.

The third, or right and left, component of the incisal guide is of great value to the orthodontist and the pediodontist. It aids us in establishing correct positional inclinations for the medially and distally inclined planes of all the cusps. When these components are functionally correct and our teeth are arranged and ground in harmony with them, there will be perfect coordination and elimination of trauma and torsion. The strain that is placed on our appliances and their anchor teeth, owing to a disregard of these components, is insidious and not quickly recognized. When carefully and physiologically adjusted, they become the most efficient factor of all the components entering into incisal guidance. They are the right and left factors that function in direct relation with the pull of the pterygoid muscles. There must be no compromising in the use of these two components. Functional articulation is impossible without the establishment of these guides. Habitual right and left movements cannot be taken care of by the law of averages. Some patients have more functional freedom on one side than on the other, with a tendency toward increased limitation on the other side. This is due to the lack of use on the other side. Such habits should be discouraged and the patient instructed to chew on both sides. If this functional freedom is being interfered with by some part of the appliance, the necessary correction should be made; or a new one should be made that will function without interference and in harmony with the kinematic requirements. Functional freedom under the control of the pterygoid muscles, with correct incisal guidance, will solve many of our problems and be a blessing to those whom we serve.

Incisal guidance and its relationship to cusp form, tooth positions and the arrangement of the teeth in the two arches have been in the past, to a large degree, a matter of guesswork. This has been due, in part, to the surreptitious influence of tooth manufacturers, and the inherited prejudices of the rank and file of our profession. The manufacturers' spellbinder delusions and their panaceas for our ills are not found in our standard textbooks. This curbstone method of teaching should not be given a place in our professional work. Their methods seldom find their way into the columns of THE JOURNAL, and it is right they should not, for they are strictly commercial in character. These spellbinders and sponsors of the only methods that will overcome our ills, are not willing to come out in the open forum, but prefer to peddle their ideas. Carelessness, indifference or the halo of being up to the minute, on the part of some of our men, makes this sort of thing possible. Any and all real findings that have a scientific foundation and are worthy of consideration should come before the various sections of our organization for study and criticism, and not to the laboratory of some commercial organization. The manufacturer should receive his instructions from the profession, and not the pro-

fession from the manufacturer. As long as we allow such a condition to continue and prosper, we have no right to the standing that the leaders of our profession are striving for. All honor to these leaders.

Balanced or functional occlusion is possible only with the correct registration of all the movements at each point of the triangle that are habitual to each case. If these are not all obtained and embodied in the articulating device, and suitable teeth are then arranged in harmony with the resultant curves, or functional arcs, we can establish balanced articulation, but not functional occlusion. The latter depends on cusp positions and the correct inclination of their several inclined planes, both in the buccolingual and mediodistal aspects. Thus, as functional requirements exist, we will have to have teeth with either deeper or more shallow sulci than those now on the market. With the corresponding variations of the rectangular groove ranging from obtuse to acute angles, there will be given us a latitude in balancing our appliance, and aid in the removal of trauma, that are not possible at this time. The general plan now followed by the manufacturer is wrong, from both the mechanical and the functional standpoint. There is too little consideration given the type, form and arrangement of the cusps of the posterior teeth. They now require too much grinding and mutilation, which makes them inefficient if not worthless units of real mastication. Many of our dentures, either partial or full, are balanced and have the much sought for three-point contact; but that is all that they do have. Real masticatory function, such as the primates enjoy, is a rare thing among civilized people of this age.

To obtain the maximum efficiency from our restorations, the anteroposterior adjustment of the incisor guide must be set to compensate for the difference of inclination of the condyle paths when they are not the same on both sides and the difference is the altitude of the triangle. We must harmonize these, or compensation is not possible. The registration of this incisal guide inclination cannot be made by right and left cheek bites. Such technic movements may be employed for obtaining condyle paths, but the straight forward movement of the mandible, parallel with the sagittal plane of the skull, must be used for this movement of the incisal point of the triangle. It can be recorded with some plastic material. Thus, in conjunction with the condyle path movement, we have recorded the three-point factors that control the compensating curves and the incising function. This record may also be obtained by following the technic that was outlined by Dr. Gysi. When these findings have been transferred to the articulator, we have the foundation for the building of the compensating curves and the guide for the degree of inclination for the mediodistal inclined planes of all the cusps. These two related factors regulate the basis upon which we establish the purely incising function. If it is not possible to obtain teeth that harmonize with this functional requirement, we will have to resort to the grinding of inclined planes that will; or resort to mesiodistal tilting.

It should not be necessary to call your attention to the need of using the face bow for transferring our records from the patient to the articulator, before any attempt is made to study and correct traumatic occlusion or malposition of

the teeth, or cusp interference or the so-called locked occlusion. I do not like the term locked occlusion. It does not have any scientific background, and is confusing to many men. We may have functional interference due to a number of causes, but never locked occlusion.

The second factor of compensation involved in incisal guidance is the right and left lateral protrusive movement. During mastication, this movement predominates above all other movements, unless the food is fibrous or very tough. During this lateral protrusive function, the rectangular grooves are working full capacity, crushing the food but not shearing and sectioning. To balance the articulation for this function, it will be necessary to adjust the incisor guide wings on each side, by right and left check bites. The wings must be tilted until the incisor pin will contact with them at the two extremes of this movement. This adjustment controls the type and capacity of the rectangular groove, and the inclined planes that enter into its formation. These inclined planes that form the groove of the artificial teeth should have the same degree of inclination as those of the natural teeth that still remain, whether it is bridgework, or partial denture work. They must correlate with the inclination of the incisor guide wings. If any error has been made, or there is an uncontrolled necessity for compensation, it will be the part of wisdom to err in favor of an obtuse sulcus angle. This will reduce cusp interference, but unfortunately it also reduces functional efficiency.

If the tooth manufacturers would give us three or four different sulcus angles, ranging from 90 to 140 degrees in each of their posterior molds, it would be a long step toward the solution of the functional occlusion problem in our restorations. It would also enable us to arrange the teeth with a minimum amount of grinding.

Dr. M. M. House, in some of his recent writings, calls attention to the necessity of grinding, or milling in, the teeth with a jig to give a certain amount of freedom in order to prevent locking the occlusion. This is a step in the wrong direction. This mortar and pestle effect militates against functional efficiency because it eliminates the value of the cusp-inclined planes and destroys the rectangular groove. It allows the patient only one functional movement of the four that are necessary to mastication. To obtain for our patients the maximum of masticatory efficiency, we must have inclined planes and not curved surfaces from the mesiodistal ridges of the cusps, to the sulcus of the tooth. These surfaces may have a curvature in the other direction without impairment of function.

The third component of the incisor guide that influences the problems of tooth arrangement is an adjustable slide on each wing. This slide, when properly adjusted, will coordinate with the rotation points or functional centers of the mandible. The functional movements of the mandible, especially when it is working under a lead, can never be centered around a single axis. Such an axis shifts at each shift of the bolus of food from one side of the mouth to the other, as the axis of the body changes as we shift the load from one shoulder to the other. This is due to the lateral tilt in two directions of the articular surface of the temporomandibular articulation, the shape and contour of the discus articularis and muscular control or guidance. It is the most variable of

all the factors that we have to consider, and yet it is the most important functional factor that the prosthetist, periodontist or orthodontist encounters in the positional and functional arrangement of the teeth and their cusps. This purely strained lateral retensive movement of the mandible is always used in heavy duty mastication and is the most important factor in the study of the etiology of traumatic occlusion. If the orthodontist will give it more careful consideration, he will solve most of his retention problems.

The best method of determining the angle of inclination of this factor of the incisal guide has been outlined by Dr. Needles of Pueblo, Colo. Space and time do not permit me to quote from his writings. When his technic has been followed, and the necessary adjustments have been made in the incisor guide and the teeth are then articulated, there will be no cusp interference, rocking of the appliance, or atrophy of the supporting tissues. Cusps will be allowed to mesh with their mesiodistal inclined planes in a perfect cutting and shearing function. It will enable the patient to section the tough food fibers with a minimum amount of strain on the appliance or the abutments. It will permit us to carve the mesiodistal inclined planes of cusp restoration with the assurance that no member of the various units will suffer from strain, or migrate or rotate under stress.

A properly adjusted incisor guide will establish tooth position and the degree of inclination of the four different cusp inclined planes, and will guide our restorations in successful functional mastication as surely as the two 110-pound rails guided the transcontinental train to Louisville.

832 Pacific Mutual Building.

DISCUSSION

V. C. Smedley, Denver, Colo.: Recently I received a letter from Dr. Frahm in which he said: "It will give me great pleasure if you will point out all the weak points in my arguments and things that were overlooked in my essay. This is my idea of a discussion. Commendation is all right, but criticism is better." A few criticisms, briefly stated, are: The paper is too long; too involved, abstruse and obscure in meaning; and too full of personalities and criticisms, either direct or implied, of other men's work, opinions and methods. Its title should have been something like the following: "Mandibular Movements and the Requirements of an Instrument for the Securing of Their Relation in the Articulation of Teeth." It is interesting to note that such students of the subject of mandibular movements as Frahm, Hanau, Needles and others, are using the word "articulation" or "functional occlusion" instead of "occlusion" as selected by the Nomenclature Committee of the American Dental Association, to mean the continuous contact of the occluding surfaces of the teeth in moving from one occlusal position to another. I think that these men are right and that the Nomenclature Committee should revise its interpretation of these terms. I should like to ask Dr. Frahm if he will be so kind as to give us a concise definition of just what he means by incisal guidance. The following is Dr. Needles' definition, and I think Dr. Frahm will agree that there is no better authority in this country today on this subject than Dr. Needles. "The incisal guidance determines the degree in which the closing element is combined with the protrusive or lateral element. Incisal guidance is the guidance of the first teeth to strike. If the area of the occluding tooth surfaces is sufficient and if the teeth are so distributed as not to produce trauma, they will register a correct incisal guidance." I feel constrained to take exception to Dr. Frahm's implied and direct attack on the followers of Dr. Monson's theories, and in fact on all advocates of a spherical theory. I believe in the principle of an adaptable instrument, preferably a fully adaptable instrument, but still I am convinced that an instrument constructed on the spherical theory, where both sides of the jaw and both condyle paths are symmetrical, or nearly so, may function to produce anatomic and satisfactorily balanced dentures. Dr. Frahm's at-

tack on dental manufacturers is certainly uncalled for and unjustified by the facts. Where would we be today if for the last twenty or fifty years the manufacturers had waited for the dental profession to do all the scientific research and come to an agreement as to our needs and requirements in instruments, tooth forms, etc.? I have no doubt that the manufacturers would be only too glad to close their expensive research and experimental laboratories and "receive their instruction from the profession." It is idealistic and ideal, but is it practical for a united profession to go sufficiently into the experimental and developmental fields to determine and agree as to what instructions to give to or requests to make of the manufacturers regarding what they should or should not manufacture for our use? As a matter of fact, the manufacturers have done a great deal to uplift and advance the science of dentistry through the introduction of constantly improving materials, supplies and equipment, with accompanying instruction and education as to the method of using and the value of these things. We have, however, a just quarrel with the manufacturers who supply us with inferior products, or who charge us exorbitant prices, and, if possible, we should resent these things by organized opposition. As I understand the line of investigation and experiment which led up to the development by Dr. House of his jig for milling in the occlusal surfaces of teeth during the final grinding process in full denture prosthesis, this instrument was made only after the careful investigation of hundreds of natural dentures, some showing no wear and others in various stages of wear, with the result that the fact was established, at least to Dr. House's satisfaction, that there is a limited rotational play in all natural dentures when closed in centric occlusion. This play is present and distinctly detectable in all natural dentures occluding without traumatism, and this jig was made to produce in artificial dentures the same freedom in occlusal contact as was found to be present in natural dentures. I should like to compliment Dr. Frahm on his emphasis on the importance of a thorough study and understanding of this whole subject of balanced functional occlusion by the periodontist and orthodontist, as well as the prosthodontist.

Dr. Frahm, in your closing remarks will you please state what further data you have discovered in advance of the facts published by Dr. Gysi bearing on the lateral shift of the mandible during heavy duty mastication.

James Kendall Burgess, New York City: Dr. Gysi has claimed for the condylar articulation the function of mandibular guidance and Dr. Frahm gives his unqualified consent to that proposition in his statement that none of the theories given and proved by Dr. Gysi have been disproved, and he speaks further of immutable truths in prosthetic dentistry that are incontrovertible. If memory serves me right, some of the theories advanced by Dr. Gysi, whether or not they have been disproved, have already been strongly controverted and seriously discredited and, at least in a limited quarter, heartily disbelieved. Dr. Frahm seems unaware that he himself has left Dr. Gysi's theory of condylar guidance in a rather precarious condition by many of the statements in his essay: "A very important feature of this problem (functional occlusion) is incisal guidance." "We cannot ignore incisal guidance and hope for success." "There is however a lateral movement during heavy mastication that had not been recorded by him." "This movement is limited, distinct and apart from any movements that are influenced by the condylar paths." "Dr. Gysi in 1920 gives us the result of his studies in masticating efficiency, showing some of the movements that the mandible is capable of making, but he does not call our attention to this powerful, limited, lateral movement." "The mandible has definite guiding factors, of which incisal guidance is not the least component." "Tooth guidance apart from incisal guidance is a huge joke. The latter controls the former," "Muscular kinetics . . . never controls the movements of the mandible. The most of these factors lie within the incisal guidance field when all the teeth are present." These and numerous other statements lead one to feel that Dr. Frahm, as he proceeds, permits his growing enthusiasm for incisal guidance at least to temper to a marked degree his zeal, expressed earlier in the essay, for Dr. Gysi's work. And so in addition to Dr. Gysi's theory of condylar guidance, we have the essayist's insistence on not only the value but also the necessity of incisal guidance as a vital component of the masticatory function. The meaning of the term is not altogether clear to me; and the statement that incisal guidance is strictly functional, and does not depend upon teeth or tooth guidance

or any other guide for the direction of its movements and that its range or limitations depend entirely on the anatomic development of the individual and is as characteristic as the individual himself does not clarify the picture very much. The scientific element in the profession who insist on some deep-laid scheme in Nature's plans for assembling and operating the denture seem to have forgotten the very fundamental facts pertaining to it. It should be perfectly plain to the more simple minded that Nature has had a service to be performed, a homely and rather menial service, and that she has created a simple and effective apparatus for its performance.

It is obvious that there must be interaction between the divisions of the mechanism carrying the implements for the continual application of force, and leverage for the production of this power. We find, therefore, the framework containing the implements of the opposing divisions anchored respectively to an immobile, resistant base above and a movable arm or lever below, the lever terminating in an expanded conformation which operates against the fulcrum situated in the immobile base, this expanded conformation being of such character and area as to provide adequate support against the fulcrum and of bulk to withstand the stress of the lever in action.

The character and relations of these opposing surfaces of the implements bear a direct relation to the degree of efficiency inherent in any given amount of applied force. It is well understood that flat surfaces compress; but their power to cut and subdivide is in inverse proportion to the extent of the area which they present to the nutrient mass. So we find imposed upon and rising from the bulky bodies of the units or implements irregular tapering protrusions broad of base and terminating in points or blades, which gives the implement what has been described as a cuspated conformation.

These implements arranged point to point in the opposing halves of the machine would still be ineffective for the service required. Nature therefore has so related them that in the closed position of the opposing halves the cusps imposed upon the units of one half rest amid and overlapping those similarly imposed upon the other half in an intercuspated relation. Thus we have—formed, assembled and related—the surfaces between which the grinding is achieved together with their retaining and supporting mechanisms and it remains to add the motive power which must activate them and cause them to function. It is evident that in the case of many substances which may compose the nutrient mass a simple clashing together of these surfaces in a vertical relation will not suffice for the complete trituration which they should undergo to prepare them for the action of the dissolving secretions. There must be added to this vertical movement, therefore, an excursive movement of the lever so that when the mass is closed upon or into and engaged amidst the cusps of the grinding apparatus, they may attack it at many angles—vertical, lateral and various combinations of these. It is essential then that the motivating equipment shall be of such character and arrangement as will produce the necessary power and apply it in these various required directions as well as that the conformation of the end of the lever, its relation to the fulcrum in the base and the character and relations of its retentive mechanism be such as to admit of these several movements necessary to this varied application of power.

We have the maxillae and their associated bony structures as the resistant base; the opposing mandible or lever through which the force is applied; the condylar articulation as the lever end and the fulcrum, constituting a free-acting hinge joint between the lever and the base; the alveolar process as the framework, carrying the teeth or implements which perform the actual service; and the muscular bands as the motive power. Condylar guidance is a myth. The condylar articulation exercises no such function. Comprising the glenoid fossa, the condylar end of the swinging lever and the retentive mechanism, its function is that of any other articulation of the organism, with such modifications as are required to accommodate the greater range of movement of the mandible in the exercise of all the masticatory functions, from excision to trituration, inclusive.

There is no more reason to suppose that the condylar articulation exercises any directional control over the movements of the mandible than there is to suppose that the movements of the feet and legs of the dancer are guided by the articulations of the ankles, the knees and the hips; those of the ball player by the articulations which his peculiar movements bring into play or those of the penman by the joints of the fingers and wrist. Each of these articulations *admits* of the movements

required in the functioning of their contiguous levers, but, unless it be conceded that the tail wags the dog, it cannot be conceded that they *guide* them. They are servants, not masters; and by the same token the condylar articulation is the servant of the mandibular function and not its master.

It is beyond reason to suppose, in the first place, that an articulator surface of the area of the condylar articulation, situated at the far end of the mandible and bearing the relation it does to the application of power and the position and weight of the load under masticatory stress, could exercise a controlling or guiding influence over the movements of a lever of the length of the mandible, and of its power in action; or in the second place, that there is any necessity for such long distance control.

Neither do I believe the theory of incisal guidance to be tenable; nor that it is the function of the teeth at all to exercise a guiding or controlling influence over the mandibular movements. It must be remembered that in the case of many nutrient substances requiring the most strenuous exercise of the masticatory function much of the work is accomplished before the occlusal surfaces of the opposing teeth come into actual contact; and without contact there cannot be guidance. In these circumstances the movements of the mandible are controlled by the directional pull of the muscles or muscle habit; and muscle habit, which is the involuntary contraction of the muscular bands in directions acquired through training and usage for the achievement of a given task, I believe to be the primary controlling factor in mandibular movements as it is in the movements of all the other levers of the organism.

When the opposing occluding surfaces do come into contact there is no doubt that the direction of the mandibular swing is influenced from that point by the relations of these surfaces, just as it is influenced by the character and bulk of the nutrient mass that holds them apart; but I believe that any influence this contact may exert toward guidance is secondary in importance to its primary function of ultimate trituration of food as well as secondary to muscle habit in mandibular control.

What is required in this contact relation is the negative function of noninterference; that is to say, there must be such coordination in the relations of the occluding surfaces as that in the excursive movements of the mandible in whatever direction. No part of any occlusal surface shall be so formed or related as to interfere with the unhampered movement over it of its antagonizing surface. Otherwise, the force of the entire muscular action will be brought against such surface to the detriment of the anchorage relations of the tooth supporting it. Why should the mandible require more guidance than is afforded by the muscles? Its purpose is not to be guided, but to serve the purposes of mastication, and this is achieved by the drive and follow through of the mandibular lever which is conducted by the muscular equipment and requires only to be unhampered by any incordination of the occlusal contacts. Dr. Frahm speaks of the failures in bridgework, saying, in one place, that a large proportion of those attributed to overloading of the abutments are directly due to the ignoring of the five components of mandibular guidance, and in another charging them against failure to bring tooth guidance into coordination with incisal guidance. Of failures aplenty in bridgework there can be no doubt. But however much any kind of occlusal incoordination and the ignoring of mandibular guidance may be responsible for them, and not to underestimate the importance of these things if they really do exist, I believe that many more failures are due to a lack of coordination between foundation resistance and occlusal stress than to failure in any and all kinds of occlusal surface coordination.

This comes back, after all, to the overloading of abutments, and it is due in large measure to lack of judgment in not including available abutments in the foundation and of intelligent care in handling those that are used.

There are other very important causes for these failures but the scope of this discussion does not warrant their consideration here. I agree with Dr. Frahm's attitude toward present-day tendencies in nomenclature. I do not know the meaning of some of the terms used in reference to occlusion, and I am honestly ashamed to ask about them for fear of displaying my ignorance. I confess it takes a hardier soul than I am to apprise a patient of the fact that he is suffering from periodontoclasia.

Perhaps my feelings are a little tender on this point since I told my friend Dr. Ottolengui that, in view of all the dontists—ortho—perio—exo—prostho—pedio—etc., being a general practitioner I felt a little lone-

some and asked if I might not call myself an omniadontist. He said it could not be done because omniadontist would be a word of mixed roots. So it seems that whether we like or not we must take over nomenclature straight, right out of the bottle. The truth is—to become serious again—that in the matter of nomenclature as in so many others we are squeezing it dry of common sense and refilling it to the point of over-saturation with sound and fury.

There is nothing mystic or occult about the dental equipment; it is not a geometrical problem requiring the services of a mathematician for its solution and those who would steep it in mystery, however obsessed they be with its welfare, do the denture itself an injustice and the cause of its prosthesis a disservice.

Dr. Frahm (closing): Dr. Smedley says that I have dealt rather hard with the methods of research of the manufacturers. We know that the manufacturers are commercializing the dental profession and it should be denounced at every opportunity. The medical profession had a similar condition to contend with until they became independent of this commercializing influence. The time is here for the dental profession to take the necessary steps to correct the sinister influence. Dr. Smedley also wants me to state what I have to say with regard to further findings relative to Dr. Gysi's bearing on the lateral shift of the mandible during heavy duty mastication. I call your attention to the fact that if we lock the teeth in close contact, we can move them laterally to a limited extent. The condyle does not move out of its socket down the inclined plane of the glenoid fossa and some patients have a great deal of denture trouble because of this. When the occlusal surfaces of the teeth contact with the condyles in their sockets, muscular control can move the mandible laterally without protrusion or opening on either side. This is the real masticating effort, and the one we should always consider. Scientific facts, no matter what they are, remain scientific facts and the truth of what I have said will some day be recognized and I am perfectly willing to let that time come in its own good way and season. Dr. Burgess says I have criticized the Monson group. This is not the fact. I have nothing to say of the group of men that work in that particular field but I do condemn the theory. There are some things that apparently, on the surface, look wonderful and some adopt them because they do not know or understand the principles involved. We sometimes have a vision of one thing or another that may appeal to us at the time, but when we get close to it, we are compelled to change our minds. I know there are able men who believe in the spherical method of articulation and seem to get results. I have worked with the Monson articulator and studied his methods and I have also worked with the Gysi and studied his methods. I am not ignorant of what each of them will do. Some results can be obtained with the spherical method, but a large group of men who have followed it were compelled to abandon it. Time is the only element of test and will prove the real worth of a theory or method. I haven't had time to read Dr. Burgess' discussion in full, but have made a few notes. He speaks of the things that have caught his vision about the dental apparatus. At first sight, we may catch a wonderful vision of things and unless we can table those first ideas and those first-sight visions and get underneath and see what they really are like, we should hesitate in passing judgment as to their real merit and their real value to the profession. It is the first time I have written on incisal guidance but I intend to write more. I am going to take it up section by section and publish them if I may, and if you will indulge with me, I believe the facts that I presented will stand out more clearly than they seem to have this afternoon.

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Editorial

THE SEVENTH INTERNATIONAL DENTAL CONGRESS

Reference to the program of the coming Congress in the present issue must convince anyone of the outstanding character of this meeting. It is safe to assert that no such program was ever before presented to the dental profession. There are fifteen sections, embracing every known subject of interest to dentists, and when the number of papers in each section is estimated, it will be found that more than 400 essays are being prepared for this meeting. The average number of men appointed to discuss each paper is two, which would, at a conservative figure, bring the total corps of speakers up to 1,200. This has to do with the literary program only. On the clinical program, there are from 800 to 1,000 operators. Think of a body of men and women of this magnitude—the very cream of the entire profession of dentistry the world over—all working together in an earnest endeavor to interpret the best that there is in dental science and art. There has never yet been such an inspiring spectacle, and it will be years before it can be duplicated or surpassed. Dentists of

this generation, therefore, have a rare opportunity in this Congress of having laid at their feet the essence of the very latest thought in the general practice of dentistry, as well as in all its specialties. There is no activity nor interest associated with dentistry that will not have detailed and expert consideration—no remote avenue of dental thought that will not be explored and illuminated.

A very encouraging aspect of the meeting to Americans is the active interest being taken in it by the profession in other countries. From every corner of the world where dentistry is practiced, there is a spontaneous and cordial cooperation in the plans and preparation for the Congress which augurs most favorably for its cosmopolitan and world-wide character. It will not be merely American dentistry but world dentistry which will be interpreted, and this is precisely as it should be in a meeting of international character.

Not only this: the Government of the United States has taken cognizance of the Congress. On April 21, the House of Representatives passed the following Joint Resolution introduced by Congressman Roy O. Woodruff:

JOINT RESOLUTION

Requesting the President of the United States to invite foreign governments to participate in the seventh international dental congress to be held at Philadelphia, Pennsylvania, August 23 to 28, 1926.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the President of the United States is hereby authorized and requested to invite foreign governments to appoint delegates and otherwise participate in the seventh international dental congress to be held at Philadelphia, Pennsylvania, August 23 to 28, 1926, under the auspices of the International Dental Federation; and for the purpose of meeting the expenses which may be actually and necessarily incurred by the Government of the United States by reason of such invitation in the observance of appropriate courtesies the appropriation of the sum of $5,000, or so much thereof as may be necessary, is hereby authorized, notwithstanding the provisions of any other Act.

Sec. 2. That the President is hereby further authorized and requested to appoint delegates not in excess of ten to represent the Government of the United States at the said congress.

On April 28, the bill was passed by the Senate and was signed by the President. The dental profession is under deep obligation

to Representative Woodruff and Senator Shipstead for the splendid work which they did in furtherance of this measure.

This legislation at once places an official stamp on the Congress, and lends to it a diplomatic character which adds one more interesting feature to the meeting. It means that foreign governments may now appropriately appoint delegates to attend and participate in the deliberations of the Congress, and that those delegates will be officially received by the President of the United States.

It is safe to assert that few people realize the magnitude of the organization of the Seventh Congress. Estimating the total number officially connected with it, we have the officers of the Congress; the Committee on Organization; the Local Committee on Arrangements; the officers of the sections; the State Advisory Committees, composed of the past presidents of state societies from 1914 to date, and the representatives of the state dental examining boards; the past presidents of the American Dental Association and the Southern Dental Association; the past presidents of the National Board of Dental Examiners; the deans of dental schools; the Committee on Clinics; the Committee on Exhibits; the Committee on Essays and Clinics from Europe; the Committee on Historical and Scientific Exhibits; the Committee on Dental Hygiene and Public Health; the Governmental exhibit, etc., making a total official family of at least 1,000 members.

No such organization has ever before been built up in the history of dentistry, and the significance of this enterprise cannot be fully grasped at a casual glance. It is typical of the most virile and energetic spirit of modern dentistry, and fully representative of the possibilities of what may be achieved by application and unity of purpose. In its evolution, it has required constant application, untiring energy, breadth of conception and clarity of vision; but the results promise ample compensation for all the effort expended. It is conservative to state that this congress will mark the most signal step in advance that dentistry has recorded up to the present time, and all that remains to make this dream

come true is for every one of the vast army who are in any way connected with it to keep up the interest thus far manifested, and not abate one jot or tittle of earnest effort till the gavel has sounded for the final adjournment.

WOMAN'S SERVICE TO THE DENTAL PROFESSION

It would seem that the time is ripe for a definite recognition of the service that woman has rendered to dentistry, and for a tribute, however inadequately expressed, to her ability, her tact, her graciousness, her loyalty and her unfailing devotion to duty in the performance of this service. Leaving out of consideration for the moment the graduate woman dentist, whose status has long since been worthily and definitely established, and who therefore needs no one to endorse her or to come to her defense, we may appropriately consider that great and growing body of women coming under the generic head of dental nurse, dental hygienist or dental assistant. Somewhat different in their functions and in the requirements of their craft, they may well be classed in one group because of the fundamentals of their calling, which represent in the broadest sense a service to the profession and to humanity.

Serving humanity, in whatever relation of life, is one of the most exalted and most glorified of all earthly endeavors, and whether she stands at the chair daily as a full fledged dental graduate, is a dental hygienist licensed by her state to perform certain prescribed operations on the patient, or is merely the assistant to a dentist, not authorized by law to do dental service, but permitted only to supplement the dentist's endeavors by a myriad ministrations, she is one and the same—a great asset to the professional life of the nation.

Woman has introduced into the practice of dentistry an element that would never have gained entrance without her. She has brought grace, diplomacy, delicacy of attention and the atmosphere of refinement and culture, where before there had been only the bare and bald relationship of patient and practitioner. She

has smoothed the rugged road of professional life, and plucked the thorns from the pathway of daily routine. She has taken from practice all those petty annoyances that bombard the dentist from early morn till the last lingering hour of a trying day. She stands as a constant buffer between the practitioner and the perpetual impositions which, without her tact, had always perplexed his soul. She has made life easier for the dentist, and has reduced the stress and strain of daily and hourly duty. She has brought the flavor of home into the office, and brightened it by the subtle grace of femininity and charm. She has introduced taste and harmony and domesticity into a professional pursuit, and has sanctified it by the priceless pearl of her gracious personality.

Let us consider each group and try to estimate the precise service that it has rendered to dentistry. The woman practitioner introduced finesse and dignity into professional life. She increased the interest in certain phases of practice that before had languished in the hands of men. She gave an impetus to child dentistry which today is bearing fruit in every section of our land. By the grace of her sex, she was able to minister to those who could not be reached by men, and she did much to break down the timidity of children in approaching the dental chair. Her service to dentistry has been unique, and her devotion has been sublime. To her, dentistry owes much, and humanity owes more. Long may she live to extend her beneficence into generations yet unborn.

And the dental hygienist—what shall we say of her service? Merely that today she is filling a niche in dental practice which is not only honorable but also honored. She is solving the problem of community and institutional service, and is thereby broadening the avenues of dentistry into fields of usefulness that had never been dreamed of before her day. She is what the trained nurse is to the physician, and she is something more. She is relieving dentists of their most irksome task, and is performing this task in a more efficient manner than has ever before been known. The demand for her services is growing daily, and when the real significance of her function becomes fully known, her sphere of

usefulness will widen till it extends throughout the length and breadth of the land. All honor to this splendid group of girls who are writing their names high on the records of professional progress and promise.

And then the dental assistants, probably the real pioneers of this noble band of professional servers, and greater in number than any other group: there is scarcely a dental office in the land which is not blessed by her beneficent service. Out of the mists and uncertainties of her early experience, when the first timid girl hesitatingly met the patients in the reception room, and tried to interpret to her employer their wishes; when she first essayed the difficult task of representing him in the routine conduct of the business affairs of the office—the making of appointments and the myriad other details; when she made her initial attempt to assist him in the technical procedures at the chair—helped him to apply the rubber dam and to minister to the comfort of the patient; when she began to gain courage enough to demand of a visitor to the reception room that he must first state the nature of his business before he could take up her employer's time; when she assumed more and more the responsibility of shielding him from the daily distractions of his practice and left him free to concentrate on the perfection of his operations; when, in short, she evolved from all of this into a full-fledged and integral part of the office machinery, and took her place bravely, serenely and confidently beside her employer as part and parcel of the entire scheme of practice management—coming up from a hesitating and an humble beginning, through discouragements and difficulties which would have daunted a less noble and heroic soul, she has at last achieved a status in professional life which not only commands the respect and commendation of the members of the profession, but even reaches out and claims the admiration and love of the public whom she serves.

In all human endeavor there is nothing finer, nothing more commendable or sublime, than the service which woman in her various capacities has rendered the dental profession, whether as practitioner, hygienist or assistant, and when the sum total of all

she has achieved for the good of the race has been recorded on the tablets of time, it will be found that, in her sphere of usefulness, she has had no mean portion in promoting the welfare and happiness of the human race. To her there must come that homage which is vouchsafed only to those who unselfishly and selfsacrificing serve their fellowmen.

CONDENSE DISCUSSIONS

Some of the speakers who are appointed to take part in the discussion of papers at dental society meetings have fallen into the habit of making their remarks needlessly long. A number of them, in fact, have presented written discussions longer than the essays which they discuss, and while this might reasonably happen in certain instances calling for special consideration, it should not be the rule, and it should not be so common as it is. The main theme of any subject is supposed to be covered by the essayist, and the function of the discussers is to sum up his findings by emphasizing those points which seem sound in theory, and by calling attention to errors, if errors exist. This can usually be done in a few terse statements without going into a lengthy and detailed dissertation covering the entire subject, and frequently leading into avenues not touched on in the paper, and not always germane to the topic. In other words, the tail should not be made to wag the dog, as has been done in too many instances in recent times. There are legitimate exceptions to every rule, but the exception should not be made the rule whereby the essay is entirely submerged by too great a tidal wave of discussion.

Officers of the Section on Bacteriology, Pathology and Diagnosis, Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

Officers of the Section on Physics, Chemistry and Metallurgy, Seventh International Dental Congress, Philadelphia, Pa., August 23-27, 1926.

DEPARTMENT OF DENTAL HEALTH EDUCATION

HOW A PROFESSIONAL ORGANIZATION CAN EDUCATE THE LAITY*

By JOHN M. DODSON†, M.D., Chicago, Illinois

OFFERING instruction to dentists as to how to teach health to the layman is, I feel, a great deal like shipping corn into Iowa; sending real estate salesmen to Florida or time-consuming talkers to the United States Senate, or offering football dope to "Red" Grange. The fact is that, in some important particulars, you have led in this matter. However, both professions are deeply interested in the subject, and interchange of experience and opinion is always helpful.

The medical and health education of the public has become, in the last few years, one of the chief subjects of interest to all who are concerned in any way with the advancement of health. There is a minority—a small minority, probably—who feel that the effort to prevent disease by the education of the public is no part of the work of the practicing physician. They feel that the doctor has discharged his full duty when he responds to a call of the victim of sickness, accident, pain or distress and has done whatever medical science can do to relieve that patient. They hold that his function lies wholly in the field of curative medicine.

Whatever view one may hold in regard to this matter, it has become, in my judgment, a purely academic question. Whether we like it or not, the layman is determined to have knowledge of medical and hygienic subjects, and especially knowledge as to how to keep well. He has come to know that it is easier, safer, surer, cheaper, more comfortable and more effectual to keep well than to get sick and be cured. This statement of a vital truth might serve as a slogan of preventive medicine, which, as distinguished from curative medicine, has developed so rapidly in recent years. It has been true, in lesser degree, for all generations of men, and finds expression in the Mosaic sanitary and hygienic code, in the code of Hamurabi and that of Egyptian wisemen of even earlier date, and in the hygienic and sanitary rules of most people of whom we have record. Hygienic and sanitary measures could have, however, only a limited range of use-

*Read at the Midwinter Clinic of the Chicago Dental Society, Jan. 28, 1926.

†Executive Secretary of the Bureau of Health and Public Instruction of the American Medical Association.

fulness previous to the last half century, when we began to have some accurate, scientific knowledge of the causes of diseases and of their modes of transmission from one person to another.

These ancient codes, curious mixtures of religious observance and sanitary practice, were born of experience which had shown that certain foods were sometimes unwholesome, and certain practices injurious. The observance of certain rules made possible the avoidance of some bad consequence, but they availed nothing to avert deadly epidemics of the plague, smallpox or various other diseases which, at times, decimated the people who rigidly observed these sanitary codes. These epidemics swept over vast areas as they do today in nations where modern methods of prevention are not practiced, or as other great pandemics not yet understood such as those of influenza continue to invade the most highly civilized nations.

The discoveries of the last 60 years have brought about a great change and have resulted in the practical elimination of several of the disease enemies of mankind. The practical gains from the progress in scientific medicine have been almost wholly in the field of prevention.

Physicians, generally, are well aware of this, but we have been so occupied in keeping abreast of the new discoveries in curative medicine, especially in diagnostic methods, that we have not sought so diligently as we might have sought the application of preventive measures. Meanwhile, as has been said, the layman has been learning of the possibilities of preventive medicine. He knows that if its beneficent possibilities are to be realized in full measure he himself must cooperate intelligently with the physician, the dentist, the health officer and others, and so there is a widespread, insistent and growing demand on the part of the public for information about medical and health matters. It is unnecessary to present to this audience the evidences of this demand. It is to be found in the innumerable articles on health in the daily press and current magazines, and in the daily requests for health talks and addresses from all sorts of lay organizations.

If the information about health that is given to the laity is to be truthful and authoritative, it must come primarily from those groups who are devoting their lives to the study of the medical sciences—in short from the medical profession, individually and collectively.

This eagerness of the public for health information is being diligently exploited. All sorts of agencies, individual and corporate, are offering information about health and disease—cultists, faddists, cranks and crooks—some honestly believing that they have discovered in a particular diet or in some special exercise or other hygienic activity the royal road to health, others apparently actuated by purely mercenary motives. A large group, recruited for the most part from the cults, are united by one dominant idea—a hatred of scientific medicine. This antagonism manifests itself in vicious attacks on important movements for human welfare which the medical profession is seeking to promote. A typical illustration is to be found in the leaflets of the American Medical Liberty League, whose official organ, the *Truth-Teller*, is published at Battle Creek.

"These leaflets," says Dr. Samuel B. Woodward, "attack not only vaccination but also anti-typhoid inoculation, the use of toxin antitoxin, the testing of cattle with tuberculin, the employment of school nurses, the disinfection of the eyes of the new-born babe, the use of chlorin in drinking water, the registration of physicians, the isolation of contagious diseases, the existence of closed hospitals, the official 'lawlessness' of boards of health and other things too numerous to mention. 'It is intolerable in a free country,' says form 67 ($2 per thousand), that medical dogma should command the police power to put into your eyes as an infant a caustic solution when cleanliness is all that is needed: invade your schoolroom; examine your body and urge medical and surgical treatment; compel you to bare your arm and take a shot of bovine syphilis, alias calf pus; compel you to drink chlorinated water (water drugged with bleaching powder); force you to have your cow injected with a disease product; forbid you to remain in your own home when sick and needing its shelter and protection more than at any other time in life; take your money in taxes to propagate the ideas and carry on the medical tyrannies here enumerated and others, and so on and so forth.' Form 79, an attack on Dr. Bundesen and the Chicago Board of Health, speaks of health gangsters, spies, meddlers and child stealers."

Let no one think that these leaflets and similar articles do no harm. They reach and are read by thousands of persons with little or no knowledge of medical science and they arouse fierce and sometimes fatal opposition to efforts which are being made to arrest or prevent epidemics or to carry out important measures for the conservation of the health of various communities.

There is profound need of strenuous, sustained effort by those who have accurate knowledge of the medical sciences, to combat this stream of false, vicious misinformation. The medical profession in its several branches, including dentistry, is the only group that is qualified to speak with authority. Other groups are cooperating very helpfully; prominent among them are teachers, nurses and social service workers, but the physician is and must continue to be the primary source of reliable information about most matters relating to health.

Fundamentally, the school teachers deal with the largest number of persons to be instructed—a vast army of children at the most impressionable and important age. The all but revolutionary change in the attitude of the educational world as to the importance of health and of training for health in our schools is one of the most striking and gratifying phenomena of our time. It is a sure promise of a healthier and health-wiser generation of citizens which is to follow our own—a generation of men and women among whom there will be a much keener appreciation of the possibilities of hygiene and sanitation than is prevalent today.

The public health nurse has made for herself a very important place in health education, especially in great health movements such as the antituberculosis and infant welfare crusaders; but it is absolutely essential to good results that she be under the close and constant guidance of the physician. This is true of the social service worker also. Fortunately, the medical and dental professions are well organized to undertake this work of the medical and health

education of the laity. The 90,000 members of the American Medical Association, are united in forty-eight state medical associations and in more than 2,000 county and local societies.

In several states, effective machinery has been set up for the dissemination of health knowledge to the public. In some, among them Maine, Ohio, Minnesota, Texas, Washington and California, organizations have been perfected, such as the Maine State Health Association, in which are represented a number of lay societies—women's clubs, the federation of labor, the manufacturer's associations, the teacher's association *et al.*—cooperating with the medical society (a constituent member of the association) on the one hand, and the department of public health on the other. In Texas, just recently, a similar organization has been perfected for the specific purpose of health education. In this, a larger number of nonmedical interests are represented.

In Illinois, the state medical society has undertaken, on a different plan, the dissemination of information about health and medical matters, and has secured the cooperation of the federation of women's clubs. In other states, conspicuous among them Connecticut, North and South Carolina, Oklahoma and Missouri, the state health departments are doing the major part of this work, with apparently the cordial cooperation of the medical profession. However, if the health education of the public is to be accomplished on a nationwide scale and is to reach, with certainty and effectiveness, the great bulk of the people, it must be localized, and each county or local unit be stimulated to active effort.

The Bureau of Health and Public Instruction of the American Medical Association has been securing information during the past few weeks as to what the county medical societies are doing along this line. It seemed important to obtain this information to serve as a guide to the activities of the bureau. At the same time, the Surgeon-General of the United States Public Health Service agreed to undertake a survey of the corresponding activities of the state and county health departments. Of 2,000 questionnaires sent to the county societies, about 1,200 have elicited replies, and 900 of them have been roughly tabulated. You will be interested, I think, in a summary of some of the replies to these questions.

The first question was: "Has your society engaged in any organized activities for promoting the education of the public in matters of health and preventive medicine?" To this, 262 secretaries answered "Yes;" 583, "No;" while forty-seven entered no reply. Approximately 30 per cent, therefore, of the county medical societies are engaged in some effort to convey health knowledge to the public. Only fourteen of them publish a bulletin or similar publication for the lay reader. It is, in fact, a rather costly and not very effective medium of instruction.

The newspapers are used for the dissemination of health information by 405 societies—nearly one-half of those replying. Seventy-seven of these have paid for newspaper space, for the most part in a few states where a newspaper health campaign was decided on by the state medical society.

Hygeia, the monthly magazine of health for the laity, published by the American Medical Association, is being utilized in one way or another by 244 societies, about 25 per cent of the total number. This magazine, I should ex-

plain, was created by action of the House of Delegates, the governing body of the American Medical Association, at its meeting in St. Louis in 1922. The first number was published in April, 1923. The plan had been in the minds of some of the leading members of the association for several years. They felt that, along with the other means which were being used to extend medical and hygienic knowledge to the nonmedical public, such a magazine would cover an important field.

Its reception by the public and by the profession has been gratifying. May I here express to the dental profession our appreciation of the warm interest which the dentists have manifested and the cordial support which they have given to this project. You have done this both in the matter of extending its circulation and by the contributions of some of the leaders in your profession. Exhibits of *Hygeia* material have been displayed at two of the annual meetings of the American Dental Association, and copies of the magazine are on display at this meeting.

By word of mouth, physicians are instructing the public by health talks and lectures of various types. Four hundred and fifteen of 892 societies report such activities. Physicians are in demand by lay organizations for talks at luncheons or dinners and for more extended addresses, by chambers of commerce, women's clubs, Rotary, Kiwanis, Lions clubs, Y. M. C. A.'s, churches and the like. Four hundred and twenty-seven medical societies, out of 863, report requests of this kind.

A still larger percentage of the secretaries report that their members could use outlines and abstracts for such talks and also illustrative material (posters, cartoons, slides, films, etc.).

Forty-two societies report using the radio for health talks; a surprising number in view of the fact that broadcasting stations are located chiefly in the large cities.

Cooperation with the lay or semi-lay health organizations is reported by about 30 per cent of the secretaries; while nearly 50 per cent have engaged, either with such cooperation or independently, in the conduct of demonstrations and clinics, such as infant welfare, antituberculosis, control of cancer, control of venereal disease and mental hygiene or examinations of school children and similar health movements.

Health exhibits or expositions have been held or participated in by 369 of 888 societies reporting, usually in connection with state or county fairs.

The last question asked had to do with periodic examinations of apparently healthy persons. One hundred and seventy-two of 892 secretaries reported some form of participation in this field; but, in a considerable number, this means only that individual members of the society are making such examinations.

The analysis of the replies to this questionnaire from nearly one-half of the secretaries of the county and local medical societies, the unit groups of the American Medical Association, is gratifying evidence of the widespread and growing appreciation by physicians of the importance of the medical and health education of the public.

Concerning the kind of health knowledge which is sought by the laity, it may be said that it covers the whole range of medicine; but certain topics are uppermost in the minds of different groups. These vary somewhat in different localities and from year to year. The dominant ideas are reflected in the

question and answer columns of a health magazine or those which come to the rostrum after a health lecture.

Dr. Lydia A. DeVilbiss, who has had a large experience as a speaker on health topics, presented this subject in an article published in *Hygeia* in July, 1924. She analyzed and classified more than 5,000 questions which had been submitted to her after her lectures to lay audiences. Among the most frequent of the queries were those relating to overweight and the proper diet for reducing, more than one-third of all the questions having to do with this topic. Conditions of the skin and hair are the theme of many inquiries; while many asked about goiter. A large proportion consisted of a description of symptoms experienced and questions as to cause and treatment. For example, "What causes a rush of blood to the head? What causes shortness of breath and what is to be done for it? What is the effect of overfatigue? What causes headache? What makes the hands and arms get numb? What causes nervousness?" Most of these symptomatic questions had to do with nervousness and pain. Questions about public health, indicating a feeling of responsibility for others, made up less than one-half of 1 per cent of the questions. There is obviously great need of developing in the laity what may be called a sanitary as well as a contagious-disease conscience. One of the most potent causes of the spread of contagious diseases, such as diphtheria, whooping-cough, scarlet fever and measles, is the ignorance and carelessness of families in which these diseases occur.

Questions about sex and sexual diseases are among the most frequent of those submitted to *Hygeia*.

In happy contrast both to the great preponderance of self-centered questions from adults having to do with disease and to the lack of interest in positive health is the evidence which has come to us as to what is going on in our schools. In 1924, *Hygeia* received, in a prize contest for high school pupils, nearly 5,000 posters on health subjects: a striking demonstration of the widespread interest in health in the schools. Of all these posters, scarcely any had to do with disease. They were all illustrations of positive health slogans such as "Walk for health," "Camping restores health," "Get the habit of health," "Nature's gifts—fresh air—outdoor exercises for better health," "Pure food for health." They furnish a convincing denial of the argument of the Eddyites and other cultists that the teaching of physiology, hygiene and allied topics to children leads to thoughts of imaginary illness.

Every youth should, of course, be taught certain facts about the more important contagious diseases as soon as he or she is able to comprehend them: such facts as the manner in which diseases are transmitted and the danger of promiscuous unguarded coughing and sneezing. That universal vaccination against smallpox is the one and only sure preventive should be drilled into the minds of everyone. Until that is accomplished, we shall continue to lead all of the civilized nations of the world in the prevalence of this loathsome disease. More than 50,000 cases occurred in the United States in 1924, with nearly 900 deaths.

Everyone is entitled to know that diphtheria, though much less frequently fatal, is about as prevalent as it was before the discovery of toxin-antitoxin

thirty years ago; while in the Schick test and toxin-antitoxin inoculation we have a certain method of prevention.

Where and how is the health education campaign being carried on?

In large part, this question has been answered by what has been said as to the methods now being used. To be far-reaching and effective, every local society, medical or dental, and every individual physician and dentist should be actively interested and engaged in this service. The large centralized organizations, such as the state medical and dental societies, and the national associations, such as the American Medical and the American Dental Association, can be of the best service in stimulating these local groups to action and by assisting them to procure the necessary materials for effective work. This the American Medical Association, through its Bureau of Health and Public Instruction, the Bureau of Investigation and other departments, is seeking to do.

To summarize: This education of the public is being accomplished by: 1. The printed word—in *Hygeia*, newspapers, magazines and other publications, in pamphlets and bulletins, reprinted from *Hygeia* and disseminated through the *Hygeia* clip-sheet, which goes each month to several thousand physicians and others, who secure the reprinting of its articles in newspapers. The clip-sheet is gladly sent without charge to anyone who will undertake to use it in this way. 2. The spoken word, by talks and addresses on health topics to lay audiences and by the radio. 3. Health exhibits and expositions, mainly in connection with state and county fairs, baby welfare conferences and the like. 4. The individual advice given by each physician and dentist to each member of his clientele in personal consultation. This means of giving health information and advice is by far the most effective of all. The listener over the radio can pass from a health talk to jazz music by a mere turn of the dial. A member of the audience at a health address may wander off into day dreaming, and even if he listens to the speaker, the impression made on him may be evanescent. The person who visits his physician or dentist or calls him to his home for professional service has given evidence of his confidence in him and is seeking advice. You dentists have a wonderful opportunity to convey useful, needed information to your clients, and you have made excellent use of it by insisting that they come to you at regular intervals for inspection and care of their teeth.

Now, in the rapidly growing custom of seeking physical examinations by those who believe themselves in health, the opportunity of the physician to instruct his clientele in hygiene and health preservation is being greatly extended. To my mind, this constitutes one of the most important features of the periodic physical examination. The detection of physical defects and the correction of those which should be and can be remedied is a health-saving measure of great value; but the advice as to the health habits of the client and his family are still more far-reaching and beneficent.

The dental profession will, I am sure, cooperate heartily in urging the members of their clientele to avail themselves of this most effective of all methods of disease prevention and health conservation—the periodic physical examination of the apparently healthy.

STATE PROGRAM OF SHEPPARD-TOWNER UNIT FOR DENTAL EDUCATION*

By G. H. WANDEL, D.D.S., Iowa City, Iowa

ON Nov. 23, 1921, Congress passed the Sheppard-Towner Act, known as "An act for the promotion of the welfare and hygiene of maternity and infancy." This act, which was to be administered through the Children's Bureau of the Department of Labor, made federal funds available when other funds were provided through individual state appropriations, the aggregate to be used in carrying out the provisions of the act. Each state accepting the provisions of the act and making the necessary appropriation must map out a program acceptable to the national commission. The Iowa State Board of Education has charge of the administration in Iowa and, under it, the Division of Maternity and Infant Hygiene was established, with headquarters in the Extension Division of the University of Iowa at Iowa City.

The Iowa plan is essentially educational. It assumes that federal and state grants always have as their primary objective the stimulation of local communities to learn how to do certain things that need to be done, and then, by virtue of this knowledge, to encourage these communities to make provision for doing these things without state or federal aid. It further assumes that the general public shall be educated to make use of such service to the fullest extent, that the individual may be brought to see that he owes it to society to be healthy. In accordance with these principles, medical and dental clinics or conferences are being held at which children of preschool age are being examined. The service is limited to diagnoses, and, for treatment of defects, parents are referred to their family physician or dentist. In connection with these clinics, group meetings and individual conferences on prenatal care are being held by women physicians with mothers and expectant mothers. There has been inaugurated a program of active cooperation with the state medical and dental societies, primarily through their respective committees, in an attempt to make available to the general practitioner the best technic and latest advances in the fields of obstetrics, pediatrics and oral hygiene. It is with the oral hygiene phase of this work in Iowa that I shall deal.

We have but one Sheppard-Towner dental clinic in Iowa at this time. The personnel consists of an advance nurse or "set-up" nurse, a dental hygienist and a dentist. We travel over the entire state of Iowa conducting dental clinics, which I will describe later. A description of our method of working will show exactly how our plan operates.

First, a dentist or a representative of a parent-teacher association, woman's club or farm bureau organization will write to our headquarters asking that

*This paper was read as a part of a symposium, the remaining papers and discussion of which will be published in a later issue.

*Read before the Section on Mouth Hygiene and Preventive Dentistry at the Sixty-Seventh Annual Session of the American Dental Association, Louisville, Ky., Sept. 24, 1925.

our dental clinic come to their community. As an answer to that request our advance nurse will go to this community. There her first duty is to interview all dentists and secure their cooperation in putting on the clinic. Then, in turn, the superintendent of schools, heads of parent-teacher associations and other organizations are interviewed and their cooperation is secured. Through the cooperation of all these organizations, a general chairman and assistant chairman are selected, as well as any other helpers that might be needed. Plans for necessary publicity are developed and announcement is made in local papers that, at a designated time, a dental clinic will be held in that community for the benefit of preschool children, the object of the clinic being thoroughly explained, and parents urged to phone or call their chairman for appointments. We do all our work by appointment, and each parent knows when to come. A few days before the clinic is set up, cards are sent to all persons who have made appointments, notifying them of the exact time of their appointment. Other important notices are also included on the card at this time. Parents are requested to notify the chairman if they cannot keep their appointment, so that the time may be filled in with some one else. This all makes for a smooth running clinic and no confusion. Time is allotted a community according to its size. We usually spend from one to two weeks in a county, giving different towns in the county the benefit of the clinic. Each community, of course, has its own chairman and subchairman. The "set-up" nurse explains everything thoroughly to these helpers in each community, so that, when we arrive, everything is in readiness and runs without a hitch. She also leaves a list of supplies which must be ready for the clinic, besides a general instruction sheet. The supplies and requirements include such things as rooms, tables, water, soap, towels, etc. We aim as nearly as possible to do all our work through the public and parochial schools, cooperating with parent-teacher associations, school boards, dental societies and other organizations as mentioned above. The question you will ask is, "Why do you work in the schools? I thought that this was a preschool proposition." Through special permission from the council at Washington we are permitted to make the following proposition to the schools: They are to allow us the use of the schools for our clinic, provided we in turn give all open time to children of the lower grades. Also, our hygienist will give health talks, toothbrush drills and prophylactic care. However, we aim to maintain our clinic on a preschool basis as nearly as possible. With the talks and toothbrush drills which the school children always receive, the maintenance of a strictly preschool clinic otherwise has not cut down the school child's interest in the least, and we are reaching a much larger group of people. Another requirement is that all children accepted at the clinic must be accompanied by the mother or the father. This insures the much-desired contact with the parent. Another requirement of the schools visited is that they must accept and adopt the nationally known system of health teaching, "The Modern Health Crusade." The reason for this last requirement is that many schools do not have any definite system of health teaching, and it also offers a means of systematic and regular follow-up to our own work. Public and parochial schools are all

treated the same. Working through the school systems provides us with necessary rooms, water, etc., as well as the desired contact with teachers, pupils, parents and school authorities; it offers a possible solution for follow-up work in an established educational system, and it augurs for the eventual adoption of school dental clinics.

Besides publicity as a means of stimulating interest in the coming visit of our dental clinic, special work in oral hygiene is encouraged in the schools prior to our visit. Posters are made and essays are written, and, in many instances, prizes are offered for the best of these. Health drills are worked up, and, frequently, complete oral hygiene programs are given, at which time the film "Tommy Tucker's Tooth" is shown. By the time our clinic arrives, parents and children are eagerly awaiting their appointments.

As regards the cost to various communities who receive the benefit of our clinics, the only expenses they must bear are our transportation while in the county, all necessary publicity, and room, towel, water and electricity requirements. Our hotel bills and transportation to and from the county as well as our salaries are all taken care of through the state fund for the administration of the Sheppard-Towner Act.

When we arrive in a community, we immediately get in touch with the chairman and set up our equipment. As equipment, we carry with us an army dental chair, cuspidor and instrument tray, a Dumore dental engine and a foot engine for an emergency, an electric sterilizer, several sets of prophylactic instruments, plenty of pumice, brushes and the like, and a liberal number of mouth mirrors, fine explorers and other supplies.

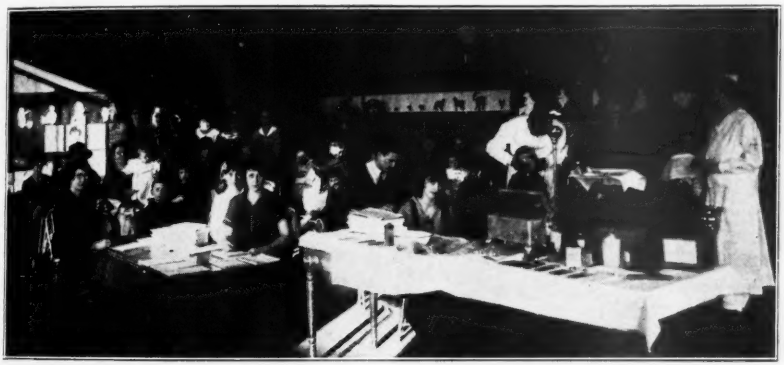
We are now ready for our patients. One of the helpers fills out an examination blank with the child's name, age, address and name of parent or guardian. We then complete our examination, charting all conditions found, securing a fairly complete prenatal and postnatal history to date. The child's diet is gone over with the mother and suggestions are made. The diet side of this work is greatly emphasized. A complete explanation of all abnormal conditions noted is made to the mother as well as of methods of treatment and reasons for such treatment. If prophylactic care is needed, the child is put in the hands of the hygienist from whom he thus gains his first impression of dental work.

Here, we feel that we accomplish much good. Ninety-seven per cent of the preschool children we see, and more than 95 per cent of the school children, have never had any work done in their mouths. Yet, they often have fear, instilled by overhearing mother or father or someone else tell of how they have suffered in having dental work done. This is to be regretted, of course, and we always caution parents about this. But it is a pleasure to see how the hygienist can drive away that cloud of fear and replace it with a feeling of trust, and in all but a few instances the child climbs out of the chair with a new and pleasant picture of dental operations, and with pride in a clean set of teeth that is going to mean much to him in years to come. Right here, I give a toast to the hygienist.

The original examination blank is always retained by us for our own records. A copy is given to the mother. At this time, she also receives our

various pamphlets, such as, "Feeding the Baby," "Diet of the School Child" and "Children's Teeth." Other pamphlets are also available at this time, such as "Prenatal Care," as well as diet score cards.

During certain periods of the day, the hygienist visits various school rooms and gives talks on oral hygiene. These talks lead up to her toothbrush drills. These drills are not given at the same time as the talks, in order that the children may not become restless and inattentive. The hygienist makes it a point not to leave a room until every pupil knows how to brush his teeth. This phase of her work covers most of the lower grades.



Preschool dental clinic.

At some time during the clinic, the students of the upper grades and high school are assembled and we discuss the various phases of oral hygiene. In addition, we give talks before the Lions, Rotary, Kiwanis and other organizations, completing our clinic with an illustrated lecture to parents covering as completely as possible the growth, development and care of children's teeth. Of course, a meeting is always held with the local dentists, and there a thorough understanding is reached as to various questions which might arise, such as a common agreement on the care of abscessed deciduous teeth and the like. At this time, there is a general discussion of the latest and accepted methods in the care of children's teeth. Before we leave a community, we always attempt to plant the seed for real, active follow-up to our work.

After the examination of thousands of children in varying localities and under varying conditions, covering an area such as the state of Iowa, after coming in contact with several thousand parents and lay people, as well as hundreds of dentists, it would not be amiss for me to make a few observations at this time.

Only five of every hundred school children we examine have mouths free of decay.

Less than 5 per cent of the school children we examine have ever received any dental attention.

Less than thirty-nine of every hundred preschool children we examine have mouths free of decay. When we

consider that this class includes children from about 8 months up to 6 years of age, this is a very low percentage of clean mouths. Of the preschool children examined, less than 3 per cent have received any dental attention.

The importance of nutrition, prenatal and postnatal, cannot be overemphasized. Since in so many of the cases with which we come in contact faulty nutrition is so plainly the cause, we have placed faulty nutrition at the top of the list of possible reasons for carious teeth. The one food element which seems to enter into this problem more than any other is milk. Too few mothers and children drink milk. Here is a field in which the dentist can surely do much good, the field of nutrition.

Hundreds of cases in which orthodontic treatment was needed are recorded in our examinations, and we cannot but hope that some day a plan or system will be devised which the average practitioner can master and which will permit early treatment and at a cost that will not make such treatment prohibitive to most of these children.

Education of the layman is badly needed. He is paying the taxes and dental bills. Education of the child is an important factor, but we must not forget that, through education of the parent, in many instances, treatment of the child is made possible.

Education of the dentist is badly needed in this field of work. He must learn to try at least to care for the oral condition in the child. Too often I hear parents say, with tears in their eyes, after they have visited our clinic and learned the disease conditions of their child's mouth, "I took Mary to Dr. So and So a year ago and he said not to bother with those teeth, that they were only temporary." When a child is brought to the dentist, he should treat its mouth as carefully as he would that of an adult. He should be patient with the child and careful not to hurt it. He should learn accepted technics in filling and in the care of a child's mouth and, at the same time, give the parents good advice as to the care of their child's mouth. We hear the old complaint, "We do not get paid sufficiently for our time when we work on children." I think this is a just complaint to a certain extent. It is difficult to charge and collect for what the work is worth, but here again the trouble lies with the dentist. Someone, years ago, meaning to do well and believing in the truth of his doctrine started the propaganda "Look out for the first permanent molar, the keystone to the dental arch. It is the most important tooth of the permanent set." I am not criticizing those who originated this idea, but I do say that they did not realize that it might have a reaction, sometime.

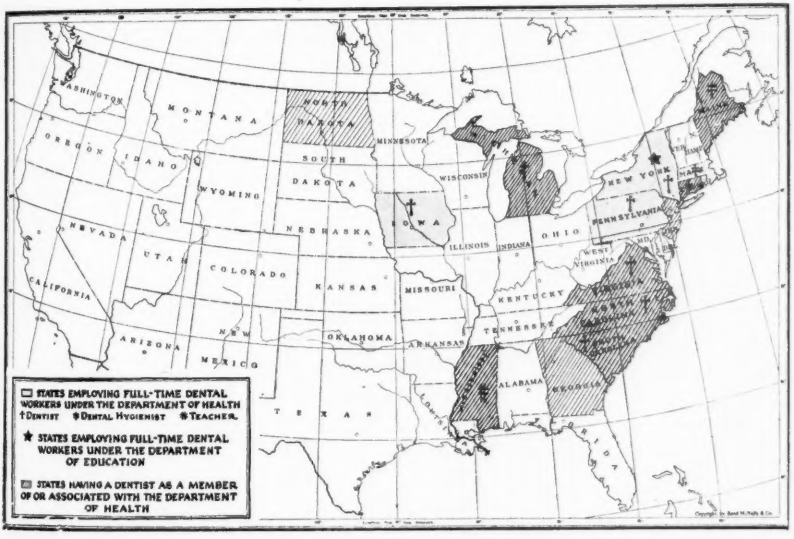
What have I observed as a result of this propaganda which has been preached by dentists, toothbrush and toothpaste companies alike? First, 95 per cent of our school children have decayed teeth, many of these being first permanent molars, and only about 5 per cent of them receive dental attention. Sixty-one per cent of preschool children have decayed teeth, many of these being first permanent molars, and less than 3 per cent receive dental attention. Thousands of parents come to us and ask when and where the first permanent molar comes in. Thousands of them say "I didn't think we had to care for the teeth until that molar came in." And this after all these years of propaganda about the first permanent molar. The sooner we can get away from the terms

temporary and permanent, the sooner we can learn to talk about *all* teeth as *teeth alone, all* having a bearing on body health, whether temporary or permanent. Then we will have made a step that will greatly advance the cause of oral hygiene for children; then the dentist will be able to command a fee in accordance with service rendered.

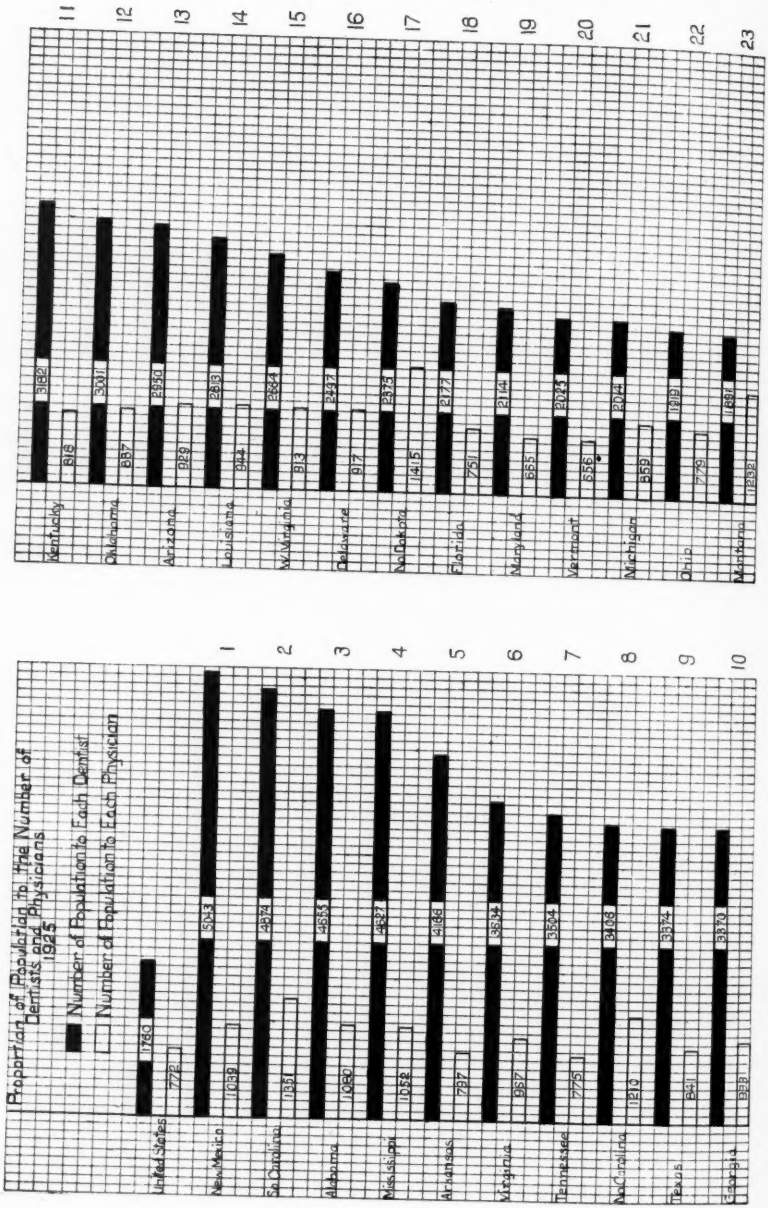
Conclusion

I would enter a plea for a general get-together of practitioners for a more common agreement and understanding of the care of children's teeth. Too often we have teeth, badly broken down and abscessed, left in the mouth to preserve space for the permanent teeth, without any thought of the damage done to the health of the child. Surely a heart lesion is more difficult to correct than malocclusion. We need some definite, general agreement as to filling technic and the best materials to use in the arrest of decay and replacement of lost tooth structure.

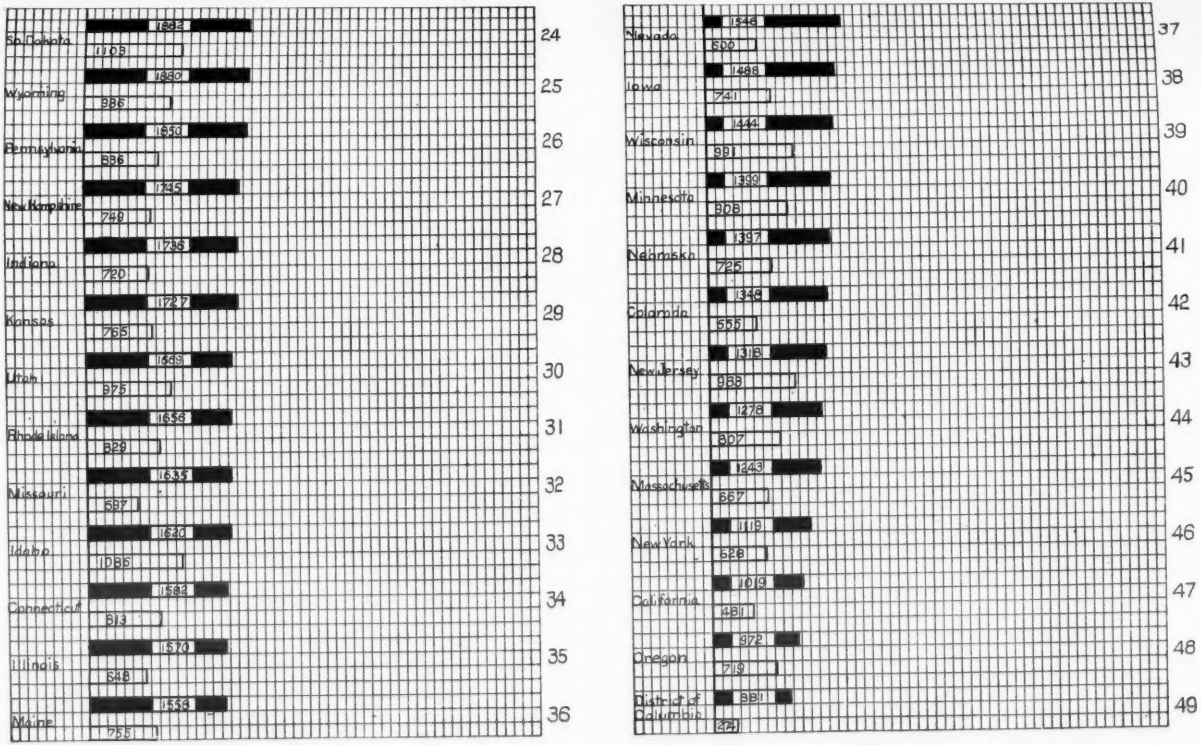
However, let us not forget this: We are entering the era of preventive dentistry, which is the coming dentistry. How much better it will be to be able eventually to wipe out this terrible army of dental cripples and replace it with young men and young women starting their life work in health and vigor.



Map showing the official dental activities of the various states. States employing full-time dental workers under the department of health. Connecticut, Iowa, Maine, Massachusetts, Michigan, Mississippi, North Carolina, Pennsylvania, South Carolina, Virginia. (New York employs a full-time dental worker under the department of education.) States having a dentist as a member of or associated with the department of health: Connecticut, Georgia, Maine, Michigan, Mississippi, North Carolina, North Dakota, New Jersey, South Carolina, Virginia.


Proportion of Population to the Number of Dentists and Physicians 1925
Number of Population to Each Dentist
Number of Population to Each Physician
United States 1780 772
New Mexico 1043 1089
So Carolina 1361 4875
Alabama 1080 4685
Mississippi 1058 4627
Arkansas 787 4186
Virginia 967 3834
Tennessee 775 3604
No Carolina 1210 3408
Texas 841 3374
Georgia 928 3370
Kentucky 818 3182
Oklahoma 887 3011
Arizona 929 2950
Louisiana 944 2819
W Virginia 813 2664
Delaware 917 2437
No Dakota 1415 2374
Florida 751 2177
Maryland 865 2144
Vermont 856 2045
Michigan 859 2024
Ohio 729 1919
Montana 1282 1887
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

Proportion of population to the number of dentists and physicians in the United States, 1925.



Proportion of population to the number of dentists and physicians in the United States, 1925.

ANNOUNCEMENT OF SUMMER SCHOOL FOR DENTAL HYGIENISTS

Arrangements have been completed by the University of Buffalo for giving a six weeks postgraduate summer course for dental hygienists. This is designed to fill the apparent need and desire of school dental hygienists for instruction in subjects that will assist them in presenting their work to children. By the advice and through the cooperation of the New York Department of Education, the following course has been arranged: education (principles of teaching), public speaking and applied oral hygiene (field problems).

Many other related courses in education are available to those who have taken all or part of these courses.

The instructors include Dr. S. R. Meaker, New York State Department; Dean Daniel H. Squire, School of Dentistry, University of Buffalo; Cora Wadsworth, formerly an instructor in New Paltz Normal School; Mary C. Boardman, dental hygienist; Mrs. George Skinner, dental hygienist.

Dr. S. R. Meaker, supervisor of oral hygiene in the state department of education, will have charge of the course. Especial effort will be taken to give the public speaking and applied oral hygiene courses in a very practical manner. As a credit of six semester hours will be given for this course, it is anticipated that boards of education will feel disposed to allow the customary increase in salary as in the case of teachers taking advanced work. A tuition fee of $36 will be charged and the regular registration fee of $3.00. Board and lodging expenses will average $12.00 a week; laundry and incidentals, from $3.00-$5.00.

Classes will be held daily, except Saturdays, beginning at 8:30 a. m., from July 6 to August 13, as a part of the regular summer school in the university. Classes will meet on Saturday, July 10.

Clinical demonstrations will be given at the University of Buffalo School of Dentistry under the direction of the Dean, Dr. D. H. Squire.

Extensive provisions have been made by the university for entertainments and excursions of pleasurable and educational value.

Only graduate dental hygienists are admitted to this course.

Further information may be obtained on request to Dr. S. R. Meaker, State House, Albany, or to Dr. C. H. Thurber, director of the summer session, 213 Foster Hall, University of Buffalo.

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Officers of the Section on Operative Dentistry, Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

Officers of the Section on Partial Denture Prosthesis (Including Crown and Bridge Work), Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

Medical and Dental News

Alabama

Alabama Association Meets: About 400 members of the Alabama State Dental Association met in their fifty-seventh annual convention, in Birmingham, April 5-7. The following took part in a program of essays and clinics: Oren A. Oliver, of Vanderbilt University, Nashville, Tenn.; J. G. Hopping, Birmingham; P. D. Chisolm, Birmingham; George Hamilton Means, Louisville, Ky.; J. W. Crawford, Milwaukee, Wis.; L. F. Pogue, Nashville, Tenn., and Joseph D. Osborne, Atlanta, Ga.

Arkansas

Southwest Arkansas Association Meets: The Southwest Arkansas Dental Association, which is composed of a number of counties, held its semi-annual meeting recently, in Texarkana, where the next meeting, to be held in the fall, will also convene. Dr. Kelly R. Spearman of Texarkana was elected president and Dr. A. W. Hudson, Prescott, secretary.

California

Work of Glendale Dental Society: Through the efforts of the Glendale Dental Society, which was organized two and a half years ago, with the object of promoting the dental welfare of the community and furthering the scientific progress of dentistry, a dental hygienist has been secured for dental prophylactic work and examinations in the schools and the establishment of a dental clinic for taking care of the indigent pupils is planned. The society meets monthly for a program of papers and clinics.

Connecticut

Connecticut Dental Association Meets: The sixty-second annual meeting of the Connecticut State Dental Association was held, April 8-10, at Bridgeport. Thursday and Friday, April 8 and 9, the following program was given: "Principles of X-Ray Diagnosis," by Hermann A. Osgood, Boston, Mass.; "Jaw Relations and Their Recording," by Victor H. Sears, New York City; "Value of Oral Hygiene to the Community," by C. N. Johnson, Chicago; "Dental Office Efficiency," by Alfred Walker, New York City; "Periodontal Disease and Its Treatment," by John Oppie McCall, New York City; "Partial Plate Prosthesis," by Edward Kennedy, New York City; "Factors Influencing Mouth Conditions During Pregnancy," by Jewell Gompertz, New Haven, and "Oral Surgery," by Theodore Blum, New York City. The final day of the session was taken up with a business meeting and a program of clinics.

Dr. Cutting Honored: A testimonial dinner was given Dr. Almond J. Cutting, Southington, May 1, by seventy of his friends. Dr. Cutting, who is president of the Connecticut State Dental Commission, and was president of the state association in 1899, has practiced dentistry for more than fifty years. Dr. Cutting received 230 congratulatory letters at the dinner, and was presented with a massive dental cabinet and a substantial purse of gold.

Florida

Annual Convention of Florida Society: At the annual meeting of the Central Dental Society of Florida, April 9-10, at Deland, the following took part in a program of clinics, lectures and discussions: Dr. C. L. Taylor, of Denver, Colo., who spoke on "Removable and Fixed Bridges;" Dr. E. W. Hawkins of Pittsburgh, Pa., whose subject was "Exodontia," and Dr. A. B. Whitman, of Orlando, who spoke on "The X-Ray, Simpson Technic."

Central Florida Dental Association Elects Officers: At its annual convention, the Central Florida Dental Association elected the follow-

ing officers: president, H. G. Bow, Deland; vice president, J. W. Simpson, Orlando; secretary-treasurer, George M. Budlong, Clermont.

Illinois

Chicago Dental Society Elects Officers: Following are the officers elected recently by the Chicago Dental Society: president, John H. Cadmus; vice president, Henry A. Frankel; secretary, Hugo G. Fisher; treasurer, I. B. Clendenen; librarian, Ashley M. Hewett.

Memberships in Honorary Fraternity Awarded: At the forty-third annual banquet of the alumni association of the Chicago College of Dental Surgery, 100 memberships in Omicron Kappa Upsilon, honorary dental fraternity, were awarded. Nearly 800 students and alumni were in attendance, representing every graduating class since 1883.

Gifts for Cancer and Dental Work: Through a trust fund set aside by the late Edwin Francis Holmes, to become available on the death of his children, $100,000 will be applied to research work on cancer at the University of Chicago. Walter G. Zoller has given $5,000 for the treatment of indigent patients suffering from dental diseases.

Dr. Printz Honored: Dr. M. M. Printz, past president of the Chicago Dental Society, was the guest of honor at a banquet given by sixty of his colleagues recently, as a tribute to his service to the society. Dr. Printz was presented with a platinum watch, and also a key of the Omicron Kappa Epsilon honorary fraternity, membership in which was conferred by Northwestern University. In presenting the key of the fraternity to Dr. Printz, Dr. Arthur Black, dean of Northwestern Dental School, stated that, although the fraternity was founded after Dr. Printz graduated, his scholastic attainments while in college were such as to render him eligible to membership.

Indiana

Fort Wayne Dentists Meet: At the tenth annual meeting of the Fort Wayne District Dental Society, papers were presented by Dr. Dana L. Woodworth, of Chicago, on "Cast-Fixed Bridgework; One Piece Castings; Cast Gold Crowns," by Dr. A. J. Kimm, Evansville, Ind., on "Interest of the State Association," and by Dr. Sherman Davis, of Indiana University, on "Relation of Nutrition to Premature Senility." The following officers were elected for the ensuing year: president, W. E. Nuenschwander; president elect, V. H. Hilgeman; secretary-treasurer H. T. Berkey.

Maryland

Dr. Grieves Honored: The Maryland State Dental Association gave a banquet, May 4, in honor of Clarence Jones Grieves, M.A., D.D.S., F.A.C.D., on the occasion of the presentation of the library of the Grieves Library Foundation to the Baltimore College of Dental Surgery, the Dental School of the University of Maryland. The presentation address was made by Dr. J. Stephenson Hopkins, president of the Maryland State Dental Association, after Dr. George E. Hardy, chairman of the board of trustees of the Grieves Library Foundation, had spoken on the Foundation and Dr. Harry E. Kelsey had responded on behalf of Dr. Grieves. Acceptance of the custody of the library was made by Dr. J. Ben Robinson, dean of the Baltimore College of Dental Surgery, after which Dr. Thomas P. Hinman, Atlanta, Ga., spoke on "Grieves, the Scientist and Author;" Dr. E. V. McCollum, Baltimore, on "Grieves, the Investigator;" Dr. Sydney R. Miller, on "Grieves and Internal Medicine," and Dr. Harvey J. Burkhart, Rochester, N. Y., on "Grieves, the Professional Man and Friend." The Clarence J. Grieves Library Foundation was established in 1925, by the Maryland State Dental Association, in honor of Dr. Grieves.

Michigan

Michigan State Society Meets: The seventieth annual meeting of the Michigan State Dental Society was held in Detroit, April 13-14, with an attendance of more than 1,000 members. Taking part in the program were Dr. Chalmers J. Lyons, Ann Arbor, W. A. Cook, Detroit, Miss Evelyn Schmidt, director of the dental health department of the American Dental Association, Chicago, and Dr. Clarence Cook Little, president of the University of Michigan.

Michigan State Dental Society Elects Officers: Following are the recently elected officers of the Michigan State Dental Society: president, W. E. Brown, Benton Harbor; second vice president, P. C. Lowery, Detroit; secretary, W. R. Davis, Lansing; treasurer, Edwin J. Chamberlain, Grand Rapids.

Minnesota

Requirements Raised: Beginning next fall, an extra year's study will be required of graduates of the college of dentistry of the University of Minnesota. Two years of preliminary work in the college of science, literature and the arts, instead of one, will be required for admission.

Montana

Liability of Hospital for Dental Work Under Industrial Contract: According to a decision reached by the industrial accident boards, hospitals must perform dental work, when it is required, on a person taken to the institution for treatment under an industrial contract. An injured miner who was taken to a Butte Hospital was refused dental treatment, rendered imperative by his injury, on the ground that the hospital had no dental department. The patient had the work performed, and the hospital has been directed by the industrial board to pay the bill.

North Dakota

Health Demonstration: A dental health program was presented in Fargo under the auspices of the Fargo-Moorhead Dental Club the first week in May. Dr. W. R. Davis, Lansing, Mich., director of the Michigan State Bureau of Dental Hygiene conducted a clinic and presented a talk on "The Needs of Preventive Dentistry for Children." Dr. R. S. Towne, of Bismarck, chairman of the oral hygiene committee of the state dental society, also took part in the program.

New York

Talks on Dental Jurisprudence: Regulations governing the handling of legal claims against dentists sued for civil malpractice were discussed by Edwin A. Jones, of the Fidelity and Casualty Company, at the Kings County Dental Society meeting recently. More than 100 members were in attendance. In the discussion that followed, the importance of keeping a radiographic record of work done was stressed, as it is thus possible to determine whether damage suffered by the patient is due to other causes than possible malpractice.

Dental Staff at Vassar Brothers' Hospital: The first dental staff of the Vassar Brother's Hospital, Poughkeepsie, appointed by the trustees to serve for the year 1926-1927 is as follows: staff supervisors and consultants: Stephen Palmer and John E. Patterson; staff attendings: J. M. Coulter, H. L. Baker, W. W. Stevens and J. O. Schoomaker; staff assistants attendings: M. L. Lawrence, A. E. Cary, R. S. Byrne and Frank Stein: consultant oral surgeons: Henry Sage Dunning and Douglas B. Parker.

Ohio

Corydon-Palmer Dental Society Meets: The Corydon-Palmer Dental Society met, May 13, at the country club, Youngstown, in an all-day session. Dr. Robert P. Dressel, Cleveland, spoke in the morning, after the business meeting, on "Three-Quarter Veneer Crowns for Bridge Abutments; Indications and Technic for Making." In the afternoon, Dr. Ewell Neil, Nashville, Tenn., gave a lecture and clinic on "The Difficult Full Lower Denture Made Easy," and Dr. J. G. Logan, Portage, Pa., spoke on "The Indispensability of the Face Bow and the Effect of a Short Radius in Full and Partial Denture Construction" and "The Control of the Molecular Behavior of Gold by External Influence in Casting."

Oklahoma

New Medical and Dental Building: A ten to twelve story building is planned to house the members of the medical and dental professions of Tulsa, at an expenditure of $750,000.

Oregon

Willamette Society Plans Rural Clinic: At the regular monthly meeting and banquet of the Upper Williamette Valley Dental Society, plans were made to establish a field dental circuit to attend to the dental work in rural communities where there are no dentists. A paper was read by Dr. J. L. Hesse, Eugene, on "Focal Infection," and Dr. J. M. Miller, also of Eugene, held a clinic on crowns.

Pennsylvania

Westmoreland County Dental Society Elects Officers: Following are the recently elected officers of the Westmoreland County Dental Society: president, W. L. Inskeep, Greensburg; vice president, W. O. Linhart, Jeanette; secretary-treasurer, Samuel Friedlander, Greensburg.

Dr. Zahniser Honored: In token of appreciation of his work in the society, Dr. F. R. Zahniser, of Greensburg, was presented by the Westmoreland County Dental Society with a gold headed cane, at the annual dinner and meeting, April 15.

Dr. Darby Honored: Dr. Edwin T. Darby, emeritus professor of operative surgery at the University of Pennsylvania, was the guest of honor at a reception given recently by the School of Dentistry and Dental Alumni Society of the University, the occasion being the forty-eighth anniversary of Dr. Darby's election to the chair of operative dentistry. For forty-five years, until his retirement in 1923, Dr. Darby held this position, and, for sixty years, carried on an active practice. Plans for the endowment of a chair of operative dentistry by the alumni society to be named the Edwin Tyler Darby Chair were announced at the reception, which was attended by more than 200 alumni.

Virginia

Dr. Sanger New President at Virginia Medical College: At the close of the eighty-seventh session of the Medical College of Virginia, May 31, Dr. William Thomas Sanger was installed as president. The ceremony of installation took place in the Lyric Theater, Richmond, at 11 a. m., Dr. Samuel, chancellor of the University of Buffalo, giving the principal address, and a reception was given Dr. and Mrs. Sanger at the Richmond Hotel in the afternoon. Dinner was served at the Commonwealth Club at 6:30. Among the speakers of the evening were Dr. Charles R. Turner, dean of the School of Dentistry of the University of Pennsylvania.

Wisconsin

Health Commissioner Asks Aid of Dentists: In view of the fact that dental examination in the schools have disclosed an alarming number of physical defects traceable to defective teeth, Dr. John P. Koehler, health commissioner, has asked each dentist of Milwaukee to devote on hour each week to caring for the teeth of indigent children.

Joint Meeting of Physicians and Dentists: At a joint meeting of the medical and dental societies of Green Bay, Drs. Theodore Squires and Harold Cramer presented a paper and discussion entitled "Focal Infection as it Pertains to Preventive Medicine." Sixty members were in attendance.

General

Anesthetists Meet: The fifth annual meeting of the Pacific Coast Association of Anesthetists and the Section on Anesthesiology of the California Medical Association was held in Oakland, Calif., April 28-29, the California Medical Association acting as hosts. Among the essayists were H. A. Thompson, San Diego, Rea Smith, Los Angeles, Dorothy A. Wood, San Francisco, LeRoy Brooks, San Francisco, Mary E. Botsford and Ethel Righetti, San Francisco, J. F. Wilkinson, Melbourne, Australia, F. H. McMechan, Avon Lake, Ohio, Donald E. Baxter, Glendale, and Edgar I. Leavitt, San Francisco.

Deaths

Boyle, John J., Hartford Conn.; died, April 11, after a brief illness; aged 53.

French, Edmund C., Eau Claire, Wis., died, April, of pneumonia; aged 81.

Frey, John A., Sioux City, Iowa; died, April 11, in Des Moines, Iowa; aged 82. Dr. Frey practiced in Ottumwa, Iowa, for fourteen years, removing to Minneapolis in 1900, where he continued to practice until his retirement, ten years ago.

Garfield, Roy M., Worcester, Mass.; Harvard University Dental School, 1896; died April 19, after an illness of several months.

Houser, William H., Taylorville, Ill.; Ohio College of Dental Surgery, 1890; died, April 3, in New Orleans, La., after a brief illness with appendicitis, aged 64.

MacMurray, L. C., Oak Park, Ill.; Chicago College of Dental Surgery, 1903; died, April 2, after a brief illness with pneumonia.

Platt, H. B., Herscher, Ill.; died, March 24; aged 71.

Rose, Charles L., Spokane, Wash.; Ohio College of Dental Surgery, 1890; died, March 25, after a four months' illness; aged 62.

Rosenbaum, Julius J., New York City; died February 26; aged 73. Dr. Rosenbaum, who was a veteran of the Civil War, had retired from practice.

Schroder, Theodore, Chicago, Ill.; University of Illinois, College of Dentistry, 1905; died, April 8, of carbon monoxid poisoning; aged 44. Dr. Schroder was found dead at the wheel of his automobile in his garage.

Officers of the Section on Full Denture Prosthesis, Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

Officers of the Section on Exodontia, Anesthesia and Roentgenology, Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

CURRENT LITERATURE

EXTRACTS AND ABSTRACTS

Rôle of Dentition in Diagnosis of Rickets: This study was based on data employed in the investigations of Hess during the last few years. The authors, Julius Blum and Jacob Mellon (*J.A.M.A.*, March 6, 1926) found strikingly few data on the rôle of dentition in rickets in the literature. The present study was carried on at the Home for Hebrew Infants, beginning in 1920, when cod-liver oil was not employed, and extending to the present time, when it is given as a routine measure. The time of eruption of the first tooth was observed in sixty-eight infants who had no rickets and in eighty-seven who had the disease in varying degrees. Only about 10 per cent of the normal infants had a tooth at the age of 6 months. The first tooth in the rachitic group appeared at the seventh month and was noted in 1 per cent. Nearly 50 per cent of the normal group had the first tooth at from the sixth to the ninth month, whereas about 25 per cent of the rachitic group had the first tooth during this period. Nearly 50 per cent of the latter had the first tooth during the ninth to the twelfth month period. At the end of the first year, all but one of the control group had one or more teeth, but only about 75 per cent of the rachitic group had a tooth or teeth erupted. Teething was delayed until the twelfth to the fifteen month in eighteen and until the fifteenth to the twenty-first month in four of the rachitic group. The authors conclude that while a study of mild rickets by means of clinical, radiologic and chemical methods showed that dentition is delayed even in this group of cases, as a diagnostic sign of rickets delayed dentition possesses little significance, owing to the variability in the time of eruption of the deciduous teeth.

Post Mortems in Dentistry: We need more post mortems in dentistry. Following extractions, teeth should be studied bacteriologically, and under the microscope, to learn how far the diagnosis in each case was correct. Indeed, in many cases bacteriological tests might be made before extraction. It is in these directions that the facilities of universities and departments of health should be used by the dental profession. The faculties of dentistry in particular, should lead in these important research problems. The profession looks to the faculties for guidance and leadership. In the interest of public health, and the advancement of dental science and practice, dental departments, with their better clinical and laboratory facilities, are expected to make a more definite contribution to the solution of these difficult problems. Members of dental faculties themselves are at wide variance in the diagnosis of radiograms, even when a complete clinical history is available. The logical procedure would be to "post mortem," every extracted tooth and compare the radiogram and clinical history with the histo-pathological report of the laboratory. Such case histories would prove of great value to the entire profession, and lead to some more definite method of diagnosis. The need of the hour is to save the teeth that ought to be saved, and extract the teeth that ought to be extracted, in the interest of the patient's health. So long as the opinions of dentists themselves are at such variance, we cannot complain about the views of the physicians. The solution lies in part in post mortems on extracted teeth.—*Oral Health*, March, 1926.

Teeth of Richmond River Blacks: Examination of the mouths of these Australian aboriginies (fifteen full blooded and thirty-seven of mixed blood, ranging in age from 2 to 70 years) by H. E. Noble (*Aus. J. Dentistry*, Jan. 1, 1926) revealed the following conditions: In a jaw that is larger and has larger teeth than in the white races and is larger in proportion to the whole anatomy,

the arches were inclined to be square and the normal occlusion of the anterior teeth was of the edge-to-edge bite variety. Only one exception was found. This condition, coupled with the fact that the muscles of mastication are very powerful, induces rapid and extensive attrition. Pathologic conditions of the soft tissues were rare in the young blacks, but nearly all the older ones had pyorrhea. One, a half-caste woman, aged 40, was wearing an ill-fitting upper denture. This and one amalgam filling in a child were the only dental work found. All the teeth were of the square type, and all were larger than in the white races. Remarkably few cases of dental defects in the full bloods and three-fourths castes, up to the age of 50, were found. Half castes and quadroons showed almost as great immunity up to the age of 21. After the age of 50, nearly all blacks lose the teeth rapidly. Only fissure cavities were found in the young, and no approximal caries until after the age of 20. Among school children, no hypoplastic enamel or defective calcification was found. The author concludes that, since the death rate among the young is high, and the sick and weak are given no care, but are allowed to die, a process of survival of the fittest has been going on for many years, and hence the race possesses a very high immunity to dental diseases. In view of the fact that the gums appeared healthy in every cases in which the occlusion was normal, it would seem that malocclusion is a great predisposing cause of pyorrhea.

Ethics and the Medical Profession: When I try to think of the most undeniable examples of an improvement in personal character and in ethical standards brought about within a few months by influences which one can put one's finger on, I can recall none so striking as the rapid moral advance of the internes at the Massachusetts General Hospital during a period of years I was in position to observe them when their "chiefs" in the medical and surgical services were men of inspiring character, as well as of remarkable skill. One could count on it. Callow youths, shapeless souls, would be transformed within the eighteen months of their service, not into saints or heroes, but into something quite miraculously better than they were eighteen months earlier. Sometimes they copied the mannerisms as well as the ideals of their "chiefs" and assumed fashions of speech or of gait ludicrously foreign to their actual natures. But without an exception that I remember during the years to which I refer, these students gained astonishingly in integrity, in sincerity, in the aspiration for self-improvement conceived, of course, primarily in professional, not in moral terms, but including, nevertheless, an infusion of genuine moral enthusiasm. These students have continued, as I have known them in later years, to meet their life opportunities with earnestness, with vim, without pretense or superciliousness, without meanness, with a good deal more honesty, generosity and liberality than their youth gave promise of.—Richard C. Cabot, in *The Survey*, March 1, 1926.

Radium in Cancer of the Mouth: The following points are emphasized by C. W. Hanford (*Arch. Phys. Ther., X-Ray & Radium*, January, 1926): 1. Early diagnosis. 2. Selection of dose sufficient to kill cancer cells. 3. Care against employing dose that will produce necrosis in surrounding tissue. In cancer of the lip, a dose of 500 mg. hours has met all requirements. In some advanced cases, radiation seems to hasten the enlargement of the submaxillary and sublingual glands. This is sometimes due to lymphatic engorgement and not to metastasis. The author condemns the use of caustics on leukoplakia patches, which are always forerunners of cancer and so demand immediate scientific treatment. In some early cases of cancer, specific treatment by a physician may cause apparent improvement for a time and give the patient a false sense of security. Technic for applying radium to leukoplakia patches, to lesions of the lip and of the tongue, and in cases of glandular involvement is given in detail. The author condemns the use of dosage as large as 1,800-2,000 mg. hours as productive of unnecessarily large necrotic areas, involving slow healing.

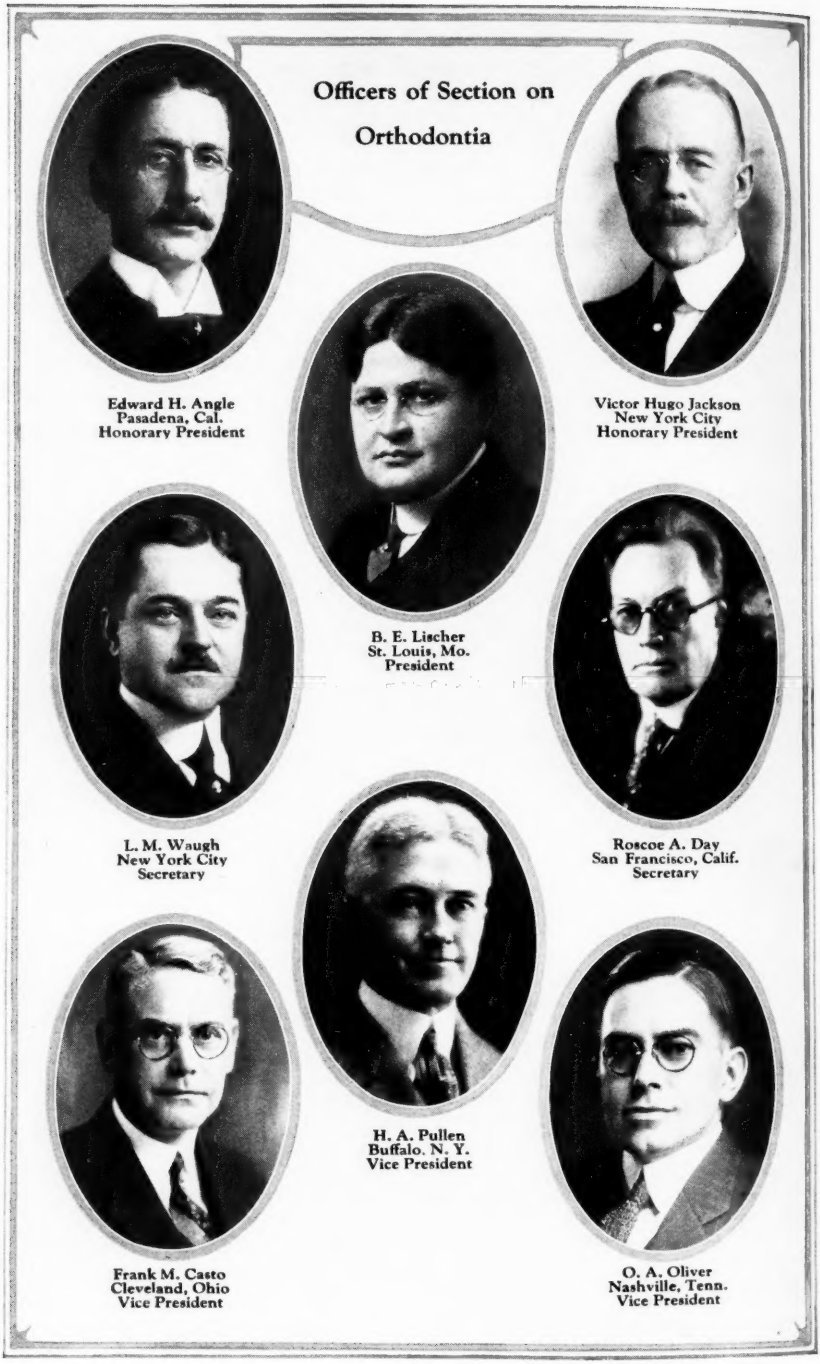
Health Examination of Preschool Child: Among preschool children malnutrition exists in from 20 to 25 per cent. Postural defects related to the muscular and skeletal systems are common, occurring in from 40 to 50 per cent. Dental defects are the most common, some 60 to 70 per cent having caries to a greater or lesser degree. Nose and throat troubles rank high as well as important totaling from 40 to 50 per cent. For

visual and eye defects quite divergent figures have been recorded. Cardiac, pulmonary, and nervous diseases are relatively low. The importance of these figures is not simply that they indicate a large part of our preschool population (estimated at some 10,000,000) is physically defective or abnormal, but that these children reach school age handicapped. These physical defects which should have been prevented or corrected are in large part responsible for the fact that some 25 per cent of children fail of promotion at the end of their first school year.—Borden S. Veeder, in *Am. J. Pub. Health*, March, 1926.

Control of Respiration in Anesthesia by Carbon Dioxid: In a discussion of the control of respiration in anesthesia by the inhalation of carbon dioxid, Yandell Henderson (*Oral Topics*, February, 1926) reaches the following conclusions: The essentials of good anesthesia are rapid induction, uniform concentration of vapor and rapid termination. In the drop method of administration, the vaporization of a liquid anesthetic is often irregular. A more uniform method of producing the vapor in proper concentration in air is desirable and is afforded by many of the forms of apparatus introduced recently. The use of a controllable amount of rebreathing is also advantageous in the maintenance of a nearly uniform concentration of the anesthetic vapor and of oxygen and carbon dioxid. An almost complete control of respiration is afforded the anesthetist by the use of carbon dioxid mixed with oxygen. By its use rapid induction and termination of anesthesia, any desired volume of breathing and depth of anesthesia are at his command. It is not the amount of anesthetic in the body which determines anesthesia, but that in the nervous system. The amount in the nervous system at all times follows closely the concentration in the arterial blood; and the concentration in the arterial blood is in turn determined by the volume of the breathing and the concentration of the anesthetic vapor in the air inhaled. Thus control of respiration is the essential element in the control of anesthesia. The use of carbon dioxid as the means of controlling respiration applies also to asphyxia of the new-born, to alcoholic intoxication, to carbon monoxid asphyxia, and to related conditions. The restoration of an approximately normal content of carbon dioxid in the lung air and in the blood and tissues of the body at the termination of anesthesia probably tends strongly to prevent the development of a postanesthetic pneumonia. It is also a means of restoring a nearly normal acid-base balance in the blood. Finally, the close similarity of hemorrhage to asphyxia renders it another of the elements whose effects are to be understood and controlled through the application of the principles of the physiology of respiration.

Streptococci in Pyorrhea Alveolaris: Pure growths of hemolytic streptococci were obtained by Thomson in all cases of pyorrhea alveolaris. In no case was the pneumococcus demonstrated by culture or animal inoculation. With one exception, the streptococci isolated from individual cases were of one type (Holman's classification). Three types were encountered: *S mitis; S. fecalis*, and *S. salivarius*. The virulence of the streptococci was studied experimentally in animals. Arthritic changes were entirely absent in all cases (with one exception, in which the streptococcus was a hemolytic type, derived from a case of osteomyelitis). Endocarditis could be produced by the injection of streptococci alone, and in most cases it was *S. salivarius* that produced this lesion. Definite kidney lesions, mainly of an interstitial type, occurred. The streptococci could be recovered from the urine over a protracted period after injection, thus demonstrating the action on the kidney during the prolonged process of elimination. The only suppurative lesions that were found occurred in the kidney and in the heart; in all cases these focal infections were due to *S. salivarius*, thus demonstrating its tendency to localize and produce pus, greater than that of *S. fecalis*. Movements of a choreiform type were produced by the injection of streptococci recovered from cases of oral sepsis.—*Edinburgh M. J.*, abstr. *J.A.M.A.*

Choking from Hypoplasia of the Mandible: Lenstrup reports three cases of violent attacks of suffocation in infants, caused by deficient development of the lower jaw, and consequent falling back of the tongue. Cleft palate was present in all of them. Fastening in the child with pillows, so it lay on side of face, prevented the choking attacks, which might otherwise have proved fatal. As the child developed, the tendency was outgrown.—*Acta Paediat*, abstr. *J.A.M.A.*



Officers of the Section on Orthodontia, Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

Officers of the Section on Maxillofacial Surgery and Surgical Prosthesis, Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

PRELIMINARY PROGRAM OF THE SEVENTH INTERNATIONAL DENTAL CONGRESS, TO BE HELD AT PHILADELPHIA, PA., AUG. 23-27, 1926

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8. J. F. Biddle, 517 Arch St., Pittsburgh, Pa. (Deceased)
9. A. D. Black, 122 So. Michigan Ave., Chicago, Ill.
10. Truman W. Brophy, 81 E. Madison St., Chicago, Ill.
11. J. P. Buckley, 1550 Hayworth Ave., Los Angeles, Calif.
12. H. J. Burkhart, Box 35, East Ave. P. O., Rochester, N. Y.
13. E. T. Darby, 1701 Locust St., Philadelphia, Pa.
14. L. E. Ford, 634 So. Western Ave., Los Angeles, Calif.
15. C. W. Hall, 123 Grand Ave., Milwaukee, Wis.
16. F. R. Henshaw, 904 Medical Arts Bldg., Indianapolis.
17. Thomas P. Hinman, Fourth National Bank Bldg., Atlanta, Ga.
18. C. N. Johnson, 22 E. Washington St., Chicago, Ill.
19. E. C. Kirk, Lock Box 1615, Philadelphia, Pa.
20. E. G. Link, 226 Cutler Bldg., Rochester, N. Y.
21. Carl D. Lucas, 609 South Grand Ave., Los Angeles, Calif.
22. William H. Potter, 16 Arlington St., Boston, Mass.
23. H. C. Miller, N. P. D. College, Portland, Ore.
24. James G. Sharp, Butler Bldg., San Francisco, Calif.
25. John F. Stephan, 1034 Keith Bldg., Cleveland, Ohio.
26. Charles R. Turner, Evans Institute, Philadelphia, Pa.
27. C. Victor Vignes, 200 Chaille Bldg., New Orleans, La.
28. R. H. Volland, Iowa City, Iowa.
29. H. L. Wheeler, 20 E. 53rd St., New York, N. Y.
30. W. R. Wright, Jackson, Miss.

COMMITTEE ON ESSAYISTS AND CLINICIANS FROM EUROPEAN NATIONS

(Working in cooperation with National Advisory Committees from European nations.)

Herbert L. Wheeler, *Chairman,* 20 E. 53rd St., New York, N. Y.

Otto U. King, *Secretary,* 58 E. Washington St., Chicago, Ill.

Truman W. Brophy, 81 E. Madison St., Chicago, Ill.

William H. Potter, 16 Arlington Ave., Boston, Mass.

William H. G. Logan, 29 E. Madison St., Chicago, Ill.

INTERNATIONAL INTERPRETING COUNSELORS

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Hugo Franz, 22 E. Washington St., Chicago, Ill.

L. E. Jelinek, 190 North State St., Chicago, Ill.

Joseph P. Massicotte, Olneyville Square, Providence, R I.

Louis Ottofy, 829 Eastwood Ave., Chicago, Ill.

Andres G. Weber, Corrales 1, esq. a Egido, Havana, Cuba.

PUBLICITY COMMITTEE

L. Pierce Anthony, 211 S. 12th St., Philadelphia, Pa.

L. P. Bethel, 185 E. State St., Columbus, Ohio.

George W. Clapp, 220 W. 42nd St., New York, N. Y.

Martin Dewey, 501 Fifth Ave., New York, N. Y.

Julio Endelman, 325 Geary St., San Francisco, Calif.

J. G. Fife, Medical Arts Bldg., Dallas, Texas.

Otto U. King, *Secretary,* 58 E. Washington St., Chicago, Ill.

COMMITTEE ON LOCAL ARRANGEMENTS

Charles R. Turner, *Chairman,* Evans Institute.

I. Norman Broomell, *Vice-Chairman,* Temple University.

L. Pierce Anthony, *Secretary,* 211 South 12th Street.

R. H. D. Swing, *Treasurer,* 226 S. 15th Street.

EXECUTIVE COMMITTEE

The Officers and A. C. Eglin, 1533 Locust Street.

SUB-COMMITTEE CHAIRMEN

R. H. D. Swing, *Finance,* 226 South 15th Street.

J. C. Salvas, *Entertainment,* 1614 Locust Street.

W. C. T. Bauerle, *Hotels,* Flanders Building.

A. H. Reynolds, *Halls and Meeting Places,* 4630 Chester Ave.

O. G. L. Lewis, *Historical and Scientific Exhibits,* 1614 Locust Street.

Z. T. Jackaway, *Registration,* 1506 E. Susquehanna Ave.

C. W. Rausenberger, *Information,* 5611 Greene Street.

J. E. Aiguier, *Publicity,* Medical Arts Building.

J. J. Coltune, *Program,* 1717 South 13th Street.

W. J. Robinson, *Clinic,* 4906 Walnut Street.

Wm. J. McKinley, *Manufacturers' Exhibit,* 17th and Spruce Sts.

Emerson Sausser, *Oral Hygiene Exhibit,* 235 South 15th Street.

Alfred P. Lee, 235 South 15th Street, Thomas B. Wade, Medical Arts Building, George H. Kuhlman, Medical Arts Building, *Members-at-Large.*

HISTORICAL & SCIENTIFIC EXHIBITS

O. G. L. Lewis, *Chairman,* 1614 Locust St., Philadelphia, Pa.

Hermann Prinz, 40th and Spruce Sts., Philadelphia, Pa.

Norman J. Leidy, 2116 Tioga St., Philadelphia, Pa.

Bernard W. Weinberger, 40 East 41st St., New York City.

Gustave C. Tassman, 1612 Locust St., Philadelphia, Pa.

F. W. Allen, Flanders Bldg., Philadelphia, Pa.

George C. Coleman, 15th and Locust Sts., Philadelphia, Pa.

Edward C. Kirk, Lock Box 1615, Philadelphia, Pa.

Arthur Hopewell-Smith, Dental Dept., University of Philadelphia, Philadelphia, Pa.

J. L. Appleton, Jr., 40th and Spruce Sts., Philadelphia, Pa.

COMMITTEE ON COMMERCIAL EXHIBITS

Charles W. Hall, *Chairman,* 123 Grand Ave., Milwaukee, Wis.

A. D. A. CLINICS

Herbert L. Wheeler, *Chairman,* 20 E. 53rd St., New York, N. Y.

Otto U. King, 58 E. Washington St., Chicago, Ill.

TRANSPORTATION

D. C. Bacon, *Chairman,* 31 No. State St., Chicago, Ill.

RULES OF THE SEVENTH INTERNATIONAL DENTAL CONGRESS

ARTICLE 1

The Seventh International Dental Congress will be held in Philadelphia, Pennsylvania, United States of America, at the Commercial Museum under the patronage of the President of the United States.

ARTICLE 2

The Congress will be opened with a General Meeting on Monday morning, August 23, 1926, at ten o'clock, and will close with a General Meeting on Friday evening, August 28, 1926, at eight o'clock.

ARTICLE 3

The object of the Congress is the advancement of dental science in its relation to public health.

ARTICLE 4

Membership in the Congress.

(a) *Active Membership.*—An ethical practitioner of dentistry possessing the qualifications of the country in which he received his professional education, or of the country in which he practices, is eligible for membership in the Congress through either of the following methods:

1. By the payment of an individual membership fee of $10.00.
2. By an accredited national dental association joining the Congress as a body in behalf of all its members, and paying from its treasury a fee of $1.00 per member for its total membership.

(b) *Associate Membership.*—Medical men and members of other scientific professions who have paid the individual membership fee of $10.00 are associate members.

(c) *Honorary Membership.*—The Committee on Organization may elect Honorary Members of the Congress.

All applications for admission to membership of the Congress must come before the Committee on Organization (or such subcommittee as may be authorized) for approval, which, in the case of foreign applicants, will act in conjunction with the official representatives of the National Committee of their respective countries as occasion requires.

ARTICLE 5

Visitors to the Congress Not Eligible for Membership.—Members may introduce members of their families as visitors to the Congress upon payment of a fee of $5.00.

Other visitors may be admitted to the Congress upon the nomination of members upon payment of the membership fee of $10.00.

Dental students vouched for by the deans or other executive officers of recognized dental schools may be admitted as visitors upon the payment of a fee of $5.00.

Dental practitioners residing in the United States of America are not eligible for admission to the Congress either as members or visitors unless they hold membership in the American Dental Association.

The names of all visitors must be submitted to and approved by the Committee on Organization, or such subcommittee as may be authorized.

ARTICLE 6

Membership Fees should be sent by postal order, draft, or check, payable to the SECRETARY GENERAL, 7th INTERNATIONAL DENTAL CONGRESS, 58 EAST WASHINGTON STREET, CHICAGO, ILLINOIS, U. S. A. A formal receipt, in the form of a membership card to the Congress, will be sent upon payment of the membership fee. Admission to the Congress will be granted only upon presentation of such a card.

ARTICLE 7

The Secretary General shall receive all moneys due from membership fees and from all other sources, and shall pay the same to the Treasurer of the Congress, who shall keep all moneys and pay out same only on written order of the President and Secretary General of the Congress. The Secretary General and Treasurer each shall give a bond in amount specified by the Executive Committee at the expense of the Congress.

ARTICLE 8

No one can be enrolled as a member of the Congress prior to the receipt of his membership fee.

An applicant when sending his membership fee should enclose his card, indicating thereon his dental or medical qualifications, titles, names of dental and medical societies in which he holds membership, and his full postal address. The Secretary General should immediately be notified of any change of address.

ARTICLE 9

Members of the Congress will receive the Official Program and the Catalog of the Exhibits gratis.

The Transactions of the Congress will be furnished, at cost, to such members as order

them, on official forms provided for that purpose, previous to the close of the Congress.

ARTICLE 10

The organization of the Congress is in charge of the Committee on Organization appointed under Article 16 of the Fédération Dentaire Internationale, or Permanent Bureau of International Dental Congresses.

ARTICLE 11

The scientific work of the Congress will be presented in

(a) General meetings
(b) Meetings of Sections
(c) Clinics
(d) Scientific Exhibits.

The amount of time allotted to each of the above subdivisions and to the Speakers at the General Meetings will be determined by the Executive Committee.

ARTICLE 12

The Congress will hold an Open General Meeting on Monday morning, August 23, 1926, at ten o'clock, and a Closing General Meeting on Friday evening, August 28, 1926, at eight o'clock.

There will be no debates at those meetings. At the Closing Meeting, the President will submit the reconstruction of the Fédération Dentaire Internationale to a vote, and if approved, the next order of business shall be the determination of the place and date of the next Congress.

ARTICLE 13

Sections of the Congress

1. Anatomy, Physiology, Materia Medica and Therapeutics.
2. Bacteriology, Pathology and Diagnosis.
3. Physics, Chemistry and Metallurgy.
4. Operative Dentistry.
5. Partial Denture Prosthesis (Including Crown and Bridge Work).
6. Full Denture Prosthesis.
7. Exodontia, Anesthesia and Roentgenology.
8. Orthodontia.
9. Maxillofacial Surgery and Surgical Prosthesis.
10. Periodontia.
11. Mouth Hygiene, Preventive Dentistry and Public Health.
12. Dental Education.
13. Dental Legislation.
14. Military Surgery.
15. History, Science and Library.

Sections may hold combined meetings with the approval of the Committee on Organization (or such subcommittee as may be authorized).

ARTICLE 14

English, French, German and Spanish will be the official languages of the Congress. Other languages may be used with the consent of the President.

ARTICLE 15

The Transactions of the Congress will be published under the authority of the Committee on Organization. The speeches delivered at the opening and closing general meetings, as well as the reports (see Article 18) will be published in full. The papers and speeches of individual members, and the reports of clinics, will be published in such form as the Publication Committee, after receiving recommendations from the sectional officers, may decide.

ARTICLE 16

Voluntary Papers and Clinics.—All those who wish to read papers or give clinics must notify the Secretary of the appropriate section before March 1, 1926. The officers of a section have the right of selection from among the papers and clinics volunteered, and of declining any they do not desire. Notices sent in after July 1, 1926, can be considered only after the program has been arranged, subject to the right of selection by the President of a section.

The Executive Committee of the Committee on Organization is granted authority to give or withhold their final approval of all papers, reports and clinics submitted to them by the officers of sections or the Clinic Committee.

ARTICLE 17

Papers may be written in English, French, German or Spanish. They must be delivered to the Secretary of the Section before which they are to be read, in typewritten form ready for printing. An abstract or summary of the important points of the papers must reach the Secretary of the Section before July 1, 1926. Notices of clinics must include a list of the clinician's requirements and must be received before July 1, 1926.

A maximum of fifteen minutes will be allowed for the reading of a paper, and five

minutes for each speaker taking part in the discussion. The author will be allowed five minutes for a reply.

ARTICLE 18

*Reports.***—In each section, time will be reserved for the discussion of important questions, which have previously been selected by the officers of the section, with due regard to the international character of the Congress. Each discussion will be introduced by two or more reporters chosen by the officers of the section. The manuscripts of these reports must be typewritten and must be sent to the office of the Congress before July 1, 1926, in order that they may be printed for distribution.

Each reporter will be allowed a maximum of fifteen minutes for an opening résumé, and ten minutes for a reply at the end of the discussion. Other speakers taking part in the discussion will be allowed a maximum of five minutes.

ARTICLE 19

Copyright of communications made to the Congress becomes thereby the property of the Committee on Organization of the Congress.

ARTICLE 20

The meetings will be conducted according to the Rules of Debate adopted for this Congress, but no vote may be taken, nor any resolution passed upon a scientific question. Any resolution that may, with the President's consent first obtained, be passed upon a question of a practical or administrative character, shall forthwith be transmitted to the Secretary General, who shall submit the same to the Committee on Organization of the Seventh International Dental Congress in conjunction with the members of the Executive Council of the Fédération Dentaire Internationale as constituted at its last annual meeting previous to the convening of the Seventh International Dental Congress.

ARTICLE 21

A speaker who desires his remarks in the course of discussion to be published in the transactions of the Congress must send a brief résumé in writing to the Secretary of the section before the end of the meeting. (Special note sheets will be provided for this purpose by the secretaries.)

**A report is a written presentation on an assigned subject given by two or more members who have been selected by the officers of this section before which it is to be presented.

ARTICLE 22

All moneys left in the treasury, after the payment of all financial obligations, shall be disbursed as follows:

1. Two-fourths to the treasury of such national accredited dental association which joined the Congress as a body. If a number of national associations join as units, the two-fourths shall be distributed to each Association with due regard to the total membership of each.

2. One-fourth to the treasurer of the Fédération Dentaire Internationale.

3. The final fourth to be retained by the Treasurer of the Seventh International Dental Congress until officially advised of the name of the Treasurer of the Eighth International Dental Congress, at which time the balance shall be transferred to said treasurer.

4. In the instance no national association joins the Congress as a unit, all moneys left in the treasury shall be disbursed as follows: three-fourths to the treasury of the Fédération Dentaire Internationale, and one-fourth to the Treasury of the Eighth International Dental Congress on the conditions herein before named.

ARTICLE 23

All correspondence should be addressed to the Office of the Congress as follows:

The Hon. Secretary General,
7th International Dental Congress,
58 E. Washington Street,
Chicago, Illinois, U. S. A.

RULES OF DEBATE OF THE SEVENTH INTERNATIONAL DENTAL CONGRESS

1. The President of a section, or in his absence or by his desire, one of the Vice Presidents, or an Honorary President, having taken the Chair, the subject before the meeting shall be announced, and the presiding officer shall call upon the reader of a paper, or a reporter in debate, or other speaker, to address the meeting.

2. During the meeting the presiding officer shall maintain order in the proceedings. All questions of procedure must be referred to him, and his decision shall be considered final.

3. Members, before speaking, must give their names in writing to the presiding officers.

4. Members desiring to take part in a discussion may inform one of the secretaries beforehand, who shall enter their names upon a list in order received for the use of the presiding officer.

5. The presiding officer will intimate to any member who may be addressing the meeting the termination of the period of his time allowance under the Rules (see Articles 17 and 18).

GREETINGS FROM THE COMMITTEE ON ORGANIZATION* OF THE SEVENTH INTERNATIONAL DENTAL CONGRESS

To Ethical Practitioners of Dentistry of All Nations:

The dental convention to be held in the City of Philadelphia, Aug. 23-27, 1926, in conjunction with the Sesquicentennial celebration of America's independence, belongs not alone to this nation but also to the world. Thus, the Seventh International Dental Congress, as evidenced by the program, will be truly cosmopolitan in character, since the dental profession of the United States of America on that occasion will be permitted happily to welcome our confréres from the sister republics to the South, the brotherly nation to the North, the peoples of the ancient countries of Asia, Africa, China and Japan, and the relatives of our progenitors, who are to be found in every European nation; and we cordially urge that they join us in large numbers that we may extend to them the hospitality of our country in return for their contribution to American dentistry, by which we will be enabled to render more efficient service to those entrusted to our care.

The Committee on Organization, the officers of the Sections, the Committee on Local Arrangements and all other groups who have so generously assisted are to be congratulated on the courage and forethought which have characterized their plans of organization in connection with this historical event. The originality and boldness of their conceptions and the magnitude and harmony of their creation have developed to a point which would seem to justify the prophecy that the Seventh International Dental Congress has every opportunity to establish itself in history as one of the most important and largest assemblies of dentists ever recorded.

As President, I am directed by the Committee on Organization to convey greetings and express appreciation to the representative dentists of the various nations who have cooperated so effectively with helpful suggestions and assisted in securing such eminent representatives from among their professional colleagues to participate in the scientific and clinical programs.

Since the scientific sections have listed the presentation of more than 400 papers, it is deemed advisable to inform all participants that the limitation of fifteen minutes, as provided in the Rules and Regulations governing the Congress, will be strictly enforced unless, by unanimous consent, an extension of five minutes is permitted; and under no circumstances will there be an additional extension of time. The Committee regrets the necessity of enforcing such a regulation, but since good sportsmanship demands that equal opportunity be granted to each contributor, we believe that we shall have the hearty cooperation of all.

Owing to the fact that the preliminary program as here presented had to be in the hands of the editor on April 23, or exactly four months to the day previous to the opening of the Congress, it was found impossible to include the full quota of honorary officers and essayists from a number of nations. We feel hopeful, however, that they will be received in ample time for inclusion in the final program.

Although the Congress now has a membership of between thirty and forty thousand the majority of whom secured their membership in the Congress under Article 4 (a) (2) Rules and Regulations governing the Congress, (see pp. 828), and we are certain that many thousands will be in attendance, we wish to assure the entire membership that such satisfactory arrangements have been provided that any member can conveniently attend any lecture or demonstration with comfort and without confusion, as fully nine-tenths of the activities are within the Commercial Museum.

The Committee on Local Arrangements earnestly requests that each member make his hotel reservations early and definitely, not later than thirty days previous to the opening of the Congress, thus avoiding disappointments that may occur if the matter of reservation is postponed until arrival in Philadelphia (see p. 886).

The committee on organization extends sincere good wishes for the happy termination of the joint efforts of all those vested with responsibility in bringing about a successful Congress, whereby international dentistry and public welfare will be greatly benefited.

W. H. G. LOGAN, *President.*

*Announcements from the committee will be found on page 888.

To the Seventh International Dental Congress, Greetings:

It is the desire of America in general, and of the 35,000 members of the American Dental Association in particular, to greet all of the foreign visitors who will meet in Philadelphia, Pennsylvania, August 23 to 27, 1926, to attend the Seventh International Dental Congress. It is the hope of America that the attendance will be great.

The officers and committees of the American Dental Association are cooperating with the committees of the Congress to make this the greatest dental convention and the most important to humanity during its history. What other time could be more propitious for such a Congress?

We wish to call attention to some of the features of the Congress to which the American Dental Association is directly contributing.

On Friday, August 27, the Congress will be given over to the clinics, at which time there will be staged a wonderful exhibition conducted by men of outstanding prominence in the various branches of the profession. The entire auditorium will be cleared of seats and will be divided into spaces, where every phase of American dentistry will be demonstrated.

The American Dental Association is planning a reception for the members of the Congress.

A luncheon will be tendered the women visiting the Congress, at which the wife of the President of the American Dental Association will act as hostess.

The House of Delegates of the American Dental Association will hold its first meeting on Saturday, August 21, immediately previous to the opening of the Congress, and will meet also on the following Monday and Tuesday.

America welcomes the dentists of the world to Philadelphia.

SHEPPARD W. FOSTER, *President*,
American Dental Association.

THE SCIENTIFIC SECTIONS*

SECTION I: ANATOMY, PHYSIOLOGY, MATERIA MEDICA AND THERAPEUTICS

OFFICERS OF SECTION

President:
Thomas P. Hinman ..... Atlanta, Ga.

Honorary Presidents:
Dr. A. Blatter ..... Paris, France
Dr. J. Howard Mummery ..... London, England
Dr. Louis Quintin ..... Brussels, Belgium
Dr. Juan Carol ..... Madrid, Spain
Dr. J. Vichot ..... Paris, France
Dr. Tsurukichi Okumura ..... Tokyo, Japan
Prof. Dr. Hermann Euler ..... Breslau, Germany
Prof. W. Lepkowski ..... Krakow, Poland
Dr. Kazuo Sato ..... Tokyo, Japan
Dr. Maria L. Rojo ..... Mexico
Dr. Federico Eyer ..... Brazil, S. A.
A. Hopewell-Smith ..... Philadelphia, Pa.
John P. Buckley ..... Los Angeles, Calif.
Hermann Prinz ..... Lansdowne, Pa.

Vice-Presidents:
Frederick B. Noyes ..... Chicago, Ill.
I. Norman Broomell ..... Philadelphia, Pa.
G. A. Crise ..... Manhattan, Kan.

Secretaries:
William Hopkinson ..... Milwaukee, Wis.
Edgar D. Coolidge ..... Chicago, Ill.

FOREWORD

"Ignorance is the curse of God; Knowledge, the wings by which we fly to Heaven."

The hearty cooperation and splendid assistance we have received in preparing our program, not only from the members of our profession in this country but also from our colleagues abroad is indeed gratifying to the officers of this Section. The usual response from those of other nations has made our program an outstanding one, and we wish, at this time, to extend to them our profound gratitude. The progress made in that part of our professional work which is to be covered in this section will be shown by the papers presented. The department of therapeutics has concentrated its efforts on the great problem now facing the profession, i.e., the treatment of the pulpless tooth. We feel

*The time allowed for presentation of a paper, including showing of slides, before a section will be limited to from fifteen to twenty minutes. Discussions will be limited to five minutes.

sure that there has never, in the history of the profession, been such a contribution of papers on this subject by authorities so eminent. We are fortunate also in having some excellent papers presented on anatomy, physiology and materia medica. To the entire program, the officers of the Section point with pride. Every paper is of a type that will compel attention. Again we wish to thank those at home who have so splendidly cooperated, and to those abroad we send a greeting, a welcome and an expression of deep appreciation of their loyalty to our profession.

THOMAS P. HINMAN.

MONDAY, AUGUST 23

10 a. m. to 12 m.

President's Address

"Functional Formation of the Jaws"
By Dr. Otto Loos ..... Frankfort-on-the-Main, Germany

"The Structures of the Mouth and Their Development as Factors Predisposing to Malformations, Focal Infection and Development of Tumors"
By Philipp Fischelis ..... Philadelphia, Pa.
Discussed by
F. C. Waite ..... Cleveland, Ohio
F. B. Noyes ..... Chicago, Ill.

2 to 5 p. m.

"Oral Surgical Anatomy"
By S. L. Silverman ..... Atlanta, Ga.
Discussed by
T. P. Hinman ..... Atlanta, Ga.
C. J. Lyons ..... Ann Arbor, Mich.

"Anatomy of Root Canals"
By Dr. Tsurukichi Okumura ..... Tokyo, Japan

"Anatomic Variation of the Human Jaw Bones"
By Milo Hellman ..... New York City
Discussed by
T. W. Todd ..... Cleveland, Ohio

"The Innervation of the Human Dentin" (Research from the scientific laboratories of Prof. Dr. Wilhelm Dieck)
By Dr. Tojoda ..... Berlin, Germany

TUESDAY, AUGUST 24

9 a. m. to 12 m.

"The Inderdental Canals"
By I. Hirschfeld ..... New York City
Discussed by
Robert H. Ivy ..... Philadelphia, Pa.
Adolph Berger ..... New York City

"A Histologic Report on Pathologic Dental Tissues of Artificial Caries Produced by Diet"
By John A. Marshall ..... San Francisco, Calif.

"Anatomy of the Gasserion Ganglion" (Illustrated with microscopic sections)
By T. P. Hinman and P. A. Stegall ..... Atlanta, Ga.

2 to 5 p. m.

"The Development of the Dental Groove"
By Dr. Walter Adrion ..... Berlin, Germany

"Physiology of the Tongue"
By Dr. J. Meyer ..... Paris, France

"Residual Mouth Odors"
By Harvey Stallard ..... San Diego, Calif.
Discussed by
Russell W. Bunting ..... Ann Arbor, Mich.
H. C. Ferris ..... New York City

"Nutrition and Teeth"
By Dr. B. Orban ..... Vienna, Austria

"Studies Concerning the Saliva"
By Dr. Knoche ..... Munich, Germany

WEDNESDAY, AUGUST 25

9 a. m. to 12 m.

"The Principles of Biologic Therapy and Measures for Increasing the Span of Human Life in the Adult"
By John P. Buckley ..... Los Angeles, Calif.
Discussed by
T. B. Hartzell ..... Minneapolis, Minn.
M. L. Rhein ..... New York City

"Therapeutic Control of Saliva"
By Dr. R. Weise ..... Berlin, Germany

"The Relation of the Dentinocemental Junction to Pulp Canal Therapy"
By John A. Marshall ..... San Francisco, Calif.
Discussed by
A. Hopewell-Smith ..... Philadelphia, Pa.
John P. Buckley ..... Los Angeles, Calif.

"Linguocellulitis of Dental Origin: Its Treatment by Vaccines"
By Dr. Dona Josefina Landete ..... Madrid, Spain

2 to 5 p. m.

"Fundamentals Essential to Successful Root Canal Therapeutics"
By U. G. Rickert ..... Ann Arbor, Mich.

Discussed by
B. S. Hert ..... Rochester, N. Y.

"Root Canal Therapy"
By Harry B. Johnston ..... Atlanta, Ga.

Discussed by
C. F. Ash ..... New York City

"The Root Canal Problem"
By M. L. Rhein ..... New York City

Discussed by
E. D. Coolidge ..... Chicago, Ill.
H. B. Johnston ..... Atlanta, Ga.

"Root Canal Therapy"
By Hermann Prinz ..... Philadelphia, Pa.

THURSDAY, AUGUST 26

9 a. m. to 12 m.

Report on "The Problem of the Pulpless Tooth"

"Diagnosis Preceding Root Canal Treatment"
By Arthur B. Crane ..... Washington, D. C.

"The Mechanics of Root Canal Treatment"
By E. M. Hall ..... Kansas City, Mo.

"The Medicinal Treatment and Filling of Root Canals"
By J. R. Blayney ..... Chicago, Ill.

"Root Canal Filling Materials"
By P. G. Puterbaugh ..... Chicago, Ill.

"The Use of Copper Amalgam in Filling Root Canals"
By F. C. Husband ..... Toronto, Canada

2 to 5 p. m.

"Causes of Periapical Infections"
By Carl J. Grove ..... St. Paul, Minn.

"Interprctation of the Histologic Characteristics of the Periapical Tissue with Regard to Root Canal Treatment"
By Arthur Hopewell-Smith ..... Philadelphia, Pa.

"Histopathologic Picture Following Root Canal Filling"
By E. H. Hatton ..... Chicago, Ill.

"Records of Pulp Canal Histories and Root Canal Filling"
By Edgar D. Coolidge ..... Chicago, Ill.

"Bleaching Teeth"
By Dr. Scherbel ..... Leipzig, Germany

At the close of the reports, an opportunity will be given each essayist in this section to demonstrate his method of filling root canals by table clinics.

SECTION II: BACTERIOLOGY, PATHOLOGY AND DIAGNOSIS

OFFICERS OF SECTION

President:
Arthur D. Black ..... Chicago, Ill.

Honorary Presidents:
Dr. H. P. Pickerill ..... New Zealand
Dr. R. Wieser ..... Vienna, Austria
Dr. B. Gottlieb ..... Vienna, Austria
Dr. H. Allerhand ..... Lwow, Poland
Prof. Dr. Wilhelm Sachs ..... Berlin, Germany
Dr. Edmond Rosenthal ..... Brussels, Belgium
Dr. Leon Frey ..... Paris, France
Dr. Rene Jaccard ..... Geneva, Switzerland
Prof. Dr. Oscar Romer ..... Leipzig, Germany
Dr. Dona Josefina Landete ..... Madrid, Spain
Dr. Kanaye Hanazawa ..... Tokyo, Japan
Dr. L. Watry ..... Antwerp, Belgium
Prof. Dr. Otto Walkhoff ..... Wurzburg, Germany
Dr. Caumartin ..... Lille, France
Dr. Friteau ..... Paris
Percy R. Howe ..... Boston, Mass.
Clarence J. Grieves ..... Baltimore, Md.

Vice-Presidents:
Weston A. Price ..... Cleveland, Ohio
Thomas B. Hartzell ..... Minneapolis, Minn.
A. H. Hipple ..... Omaha, Nebr.

Secretary:
Russell W. Bunting ..... Ann Arbor, Mich.

FOREWORD

Section II extends greetings to the profession of the world and presents its preliminary program. In preparing the program of this Section, an effort has been made to secure as many as possible of the workers whose names are known the world over for

their splendid studies in histopathology and bacteriology in the dental field. Appreciation is herewith expressed to all who are contributors. Invitations have been extended to several others, in foreign lands, from whom replies are expected within a few weeks. The American dentists of this particular group of workers extend to confréres in other lands a most cordial welcome to meet in Philadelphia in August for the discussion of these subjects, which are fundamental to the progress of the splendid service which dentistry is contributing to the advancement of health.

ARTHUR D. BLACK.

MONDAY, AUGUST 23

10 a. m. to 12 m.

President's Address: "The Field of Research in Dentistry."

The Histopathology of the Enamel and Dentin

"Structure of the Enamel and Dentin with Reference to Pathology"
By J. Howard Mummery.....London, England

"Report on J. Leon Williams' Studies of the Pathology of the Enamel, with Report of Experiments to Determine the Presence or Lack of Metabolic Changes in the Enamel"
By William J. Gies.....New York City

"Studies of the Enamel"
By Rufus W. Leigh....Washington, D. C.

2 to 5 p. m.

The Pathology of Dental Caries

"Bacteriologic Studies of Dental Caries"
By Russell W. Bunting.....Ann Arbor, Mich.

"Bacteriologic Studies of Dental Decay, Particularly as Affecting the Hard Dental Tissue"
By Tsurukichi Okumura....Tokyo, Japan

"Metabolism, Glands of Internal Secretion and Dental Caries"
By R. Jaccard.....Geneva, Switzerland

"The Morphology of the Oral Flora"
By Theodore B. Beust.....Louisville, Ky.

TUESDAY, AUGUST 24

9 a. m. to 12 m.

"Tissue Changes in Pyorrhea"
By B. Gottlieb.....Vienna, Austria

"Studies of the Peridental Tissues"
By W. G. Skillen and Emil Mueller.....Chicago, Ill.

"Clinical Value of Blood Counts in Gum Bleeding"
By Shirokuro Endo.....Tokyo, Japan

"The Lymphatics of the Peridental Membrane and Dental Pulp"
By Frederick B. Noyes.....Chicago, Ill.

Congress Hall, where the first Congress of the United States met.

2 to 5 p. m.

Focal Infections

"The Teeth in Relation to General Health"
By E. C. Rosenow.....Rochester, Minn.

"The Problem of Focal Infection as Presented in European Literature"
By H. Allerhand.....Lwow, Poland

"Pathologic Aspects of Tooth Infection"
By Russell L. Haden....Kansas City, Mo.

"Clinical Case of Femoral Neuritis Having a Focal Dental Origin"
By Rafael Biada.....Havana, Cuba

"Ludwig's Angina of Dental Origin"
By J. Meyer.....Paris, France

WEDNESDAY, AUGUST 25

9 a. m. to 12 m.

"Papers and Reports on Focal Infections"

(Discussion of papers read at a previous meeting)

By Edward H. Hatton.....Chicago, Ill.
J. G. Meisser .....Cleveland, Ohio

2 to 5 p. m.

Etiology and Treatment of the Dental Pulp and Chronic Alveolar Abscess

"Histopathology of the Dental Pulp"
By Silvio Palazzi .....Milan, Italy

"Pulpotoxin"
By Dr. Tadashi Masaki....Tokyo, Japan

"Extemporaneous Sterilization of Cotton Wicks for Root Canals"
By Dr. F. Brochier.....Paris, France

"Clinical Significance of Infected, Degenerated Vital Pulps as Compared with the Infections About Teeth with Root Fillings"
By U. G. Rickert.....Ann Arbor, Mich.

"Comparison of the Pathologic Changes of Pericementitis and Pulpitis"
By Dr. Kanaye Hanazawa Tokyo, Japan

"Bacteriologic Study of the Pulpless Tooth"
By M. L. Rhein .....New York City

THURSDAY, AUGUST 26

9 a. m. to 12 m.

Diet in Relation to Dental Caries and Pyorrhea

"Report on Dental Disorders in the Sugar Industry"
By Edmond Rosenthal and L. Watry
.....Brussels, Belgium

"Experimental Study of the Changes in the Dental and Oral Tissues Due to Vitamin Deficiency"
By Tadashi Masaki.....Tokyo, Japan

"Tooth Development"
By Dr. Bell .....Dunedin, New Zealand

"Development of the Teeth and Jaws of Animals Under Normal and Abnormal Conditions"
By Dr. Proell .....Germany

"Investigations of Dental Caries"
By P. R. Howe .....Boston, Mass.

"The Relation of Oral Spirochetosis to Pulmonary Gangrene"
By B. S. Kline (M.D.) and F. S. Berger (M.D.).....Cleveland, Ohio

"Calcium; Its Activation, Utilization and Disturbances; Report of Researches"
By Weston A. Price.....Cleveland, Ohio

2 to 5 p. m.

General clinic. All the essayists on the program of Section II will be given an opportunity to present slides, charts and pathologic specimens in the form of table clinics to illustrate the ideas presented in their papers.

SECTION III: PHYSICS, CHEMISTRY AND METALLURGY

OFFICERS OF SECTION

President:

Marcus L. Ward .....Ann Arbor, Mich.

Honorary Presidents:

Dr. Bennejeant .....Oran, France
Prof. Dr. Schonbeck.....Berlin, Germany
Dr. Elander .....Goteberg, Sweden
Dr. Franchette .....Paris, France
Dr. A. A. Nouel.....Venezuela, S. A.
James H. Prothero.....Chicago, Ill.
J. B. Robinson .....Baltimore, Md.
William T. Chambers .....Denver, Colo.

Vice-Presidents:

L. E. Ford .....Los Angeles, Calif.
J. A. C. Hoggan .....Richmond, Va.
John F. Stephan .....Cleveland, Ohio

Secretaries:

Arthur R. McDowell San Francisco, Calif.
R. H. Volland.....Iowa City, Iowa

FOREWORD

It is especially pleasant to extend greetings and words of welcome to those interested in Section III, encompassing as it does three subjects that have attracted the attention of the public through the application of the marvelous developments in them to the happiness of mankind, to the progress of industry and to the readjustment of education in science. Physics, chemistry and metallurgy as pure sciences are fast becoming part of the work of preparatory schools and colleges, but the application of them has become not only a function of the professional schools but also a part of the duties of every person in any walk of life. The application of these subjects under the name of engineering

is well known even to the pupils in the grade schools. The work of physicists in the field of the atom, and especially that part relating to the behavior and nature of the electron, has touched some of the secrets of life as they have never been revealed before, thereby making obsolete much of the information that has heretofore been regarded authentic. Your chairman extends thanks for the cooperation of the officers of this section in their efforts to present a program during this, the most rapid transition in the scientific development of the world, and expresses the sincere hope that mutually beneficial discussions with representatives of other countries will take place at the approaching Congress.

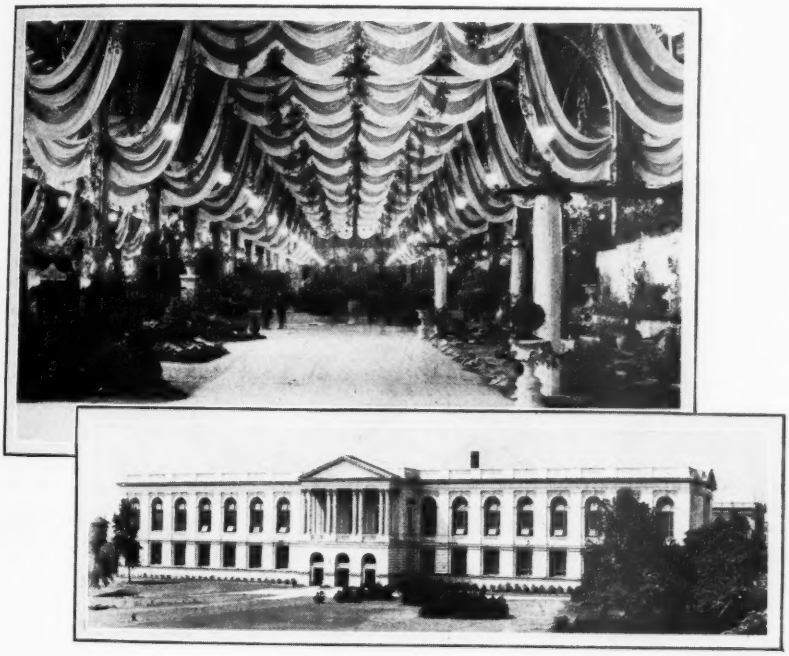
MARCUS L. WARD.

MONDAY, AUGUST 23

10 a. m. to 12 m.

President's Address

"Selection of Dental Materials"
By Wilmer Souder (Ph.D.) .....
.....Washington, D. C.



Below: Philadelphia Commercial Museum, where the Seventh International Dental Congress will be held. Above: Convention Hall, Philadelphia Commercial Museum.

"Biologic Chemistry and the Dental Curriculum"
By Joseph S. Hepburn (Ph.D.).....
..... Philadelphia, Pa.

2 to 5 p. m.

"Physical Chemistry of Dental Cement"
By Walter S. Crowell (B.S.) .....
.....Philadelphia, Pa.

"Metallurgic Phenomena in Dental Alloys"
By John S. Shell (M.A.) ..... San Francisco, Calif.

"Chemical Problems in the Dental Office"
By Ingo W. D. Hackh (A.B.) ..... San Francisco, Calif.

"Technic Metals"
By Norris O. Taylor (Ph.D.) ..... Iowa City, Iowa

"Electromotive Phenomena in Teeth"
By W. R. Amberson (Ph.D.), R. W. Williams and H. Klein ..... Philadelphia, Pa.

Part I. Clinical Observations, presented by Mr. Williams. Part II. Theory, presented by Mr. Klein.

SECTION IV: OPERATIVE DENTISTRY

OFFICERS OF SECTION

President:

C. N. Johnson ..... Chicago, Ill.

Honorary Presidents:

Dr. J. M. Whitney ..... Honolulu, T. H.
Dr. A. E. Webster ..... Toronto, Canada
Prof. Dr. Wilhelm Dieck ..... Berlin, Germany
Dr. M. deBoer ..... Amsterdam, Holland
Prof. H. Wilga ..... Warsaw, Poland
Dr. Georges Roussel ..... Paris, France
Mr. J. W. Switters ..... Utrecht, Holland
Prof. Dr. E. Metral ..... Geneva, Switzerland
Dr. Eco Calderon C. ..... Mexico
Dr. Lubetski ..... Paris, France
Prof. Dr. G. A. Stoppany ..... Zurich, Switzerland
Dr. Morineau ..... Paris, France
Dr. N. Etchepareborda ..... Buenos Ayres, Argentina
Dr. Luis C. Aleman ..... Paraguay, S. A.
Edwin T. Darby ..... Philadelphia, Pa.
W. H. Taggart ..... Chicago, Ill.
Edward K. Wedelstaedt ..... St. Paul, Minn.

Vice-Presidents:

C. E. Woodbury ..... Council Bluffs, Iowa
Donald M. Gallie ..... Chicago, Ill.
John V. Conzett ..... Dubuque, Iowa

Secretaries:

W. L. Fickes ..... Pittsburgh, Pa.
H. M. Semans ..... Columbus, Ohio

FOREWORD

A brief glance at the program for Section IV will convince the reader that the officers of the Section have enjoyed the hearty cooperation of the most noted men in the field of operative dentistry. Never has there been a more cordial attitude manifest on the part of our best writers toward any meeting than that displayed in the present instance in the building of this program. When the fact is noted that not one refusal to cooperate has been received by the officers of Section IV, it is an eloquent demonstration of the spirit which pervades the profession in connection with the coming Congress. Even our colleagues from other countries seem only too anxious to aid in any way in advancing the interests of the Section, and the officers hereby tender their thanks to all who have responded to their appeal. A slight and very desirable change, at a late moment, in the plan of presenting certain of the topics has necessitated the addition of a few names which are not included in the present list, but which will be added before the official program goes to press.

C. N. JOHNSON.

MONDAY, AUGUST 23

10 a. m. to 12 m.

President's Address

"Report on Gold Foil"
By Charles E. Woodbury ..... Council Bluffs, Iowa
Frederick H. Waters ..... Ames, Iowa
Robert E. Blackwell ..... Chicago, Ill.

"Proper Form of Fillings"
By William Finn ..... Pittsburgh, Pa.
John Scholten ..... Cedar Rapids, Iowa
H. A. True ..... Des Moines, Iowa

Report on Cavity Preparation

"Cavity Preparation for Foil"
By John V. Conzett ..... Dubuque, Iowa

"Cavity Preparation for Amalgam"
By R. R. Byrnes ..... Atlanta, Ga.

"Cavity Preparation for Gold Inlays"
By Roscoe H. Volland ..... Iowa City, Iowa

2 to 5 p. m.

"Amalgam Operations"
By E. K. Wedelstaedt ..... St. Paul, Minn.
H. E. Friesell ..... Pittsburgh, Pa.
Charles E. Woodbury ..... Council Bluffs, Iowa

"General Practice of Operative Dentistry"
By Alfred Walker.....New York City
Charles F. Bodecker..New York City
H. E. Friesell.....Pittsburgh, Pa.

"Conservatism in Operative Dentistry"
By Henry W. Gillett.....New York City
Edward B. Spalding.....
.....Birmingham, Mich.
Thaddeus P. Hyatt.....New York City

"Management of Margins"
By W. D. Tracy .....New York City
O. G. L. Lewis.....Philadelphia, Pa.
John J. Travis.....Ann Arbor, Mich.

"Teaching Operative Dentistry"
By R. R. Byrnes .....Atlanta, Ga.
H. M. Semans .....Columbus, Ohio
A. C. LaTouche....Los Angeles, Calif.

Report on Porcelain

"Its Properties"
By William A. Capon....Philadelphia, Pa.

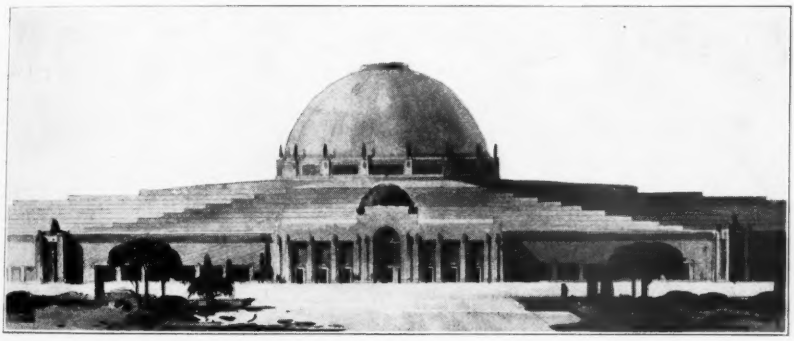
"Its Indications as a Filling Material"
By J. Melville Thompson Detroit, Mich.

"Technic as It Relates to Inlays"
By W. D. Vehe.....Minneapolis, Minn.

"Its General Indications"
By A. L. LeGro.....Detroit, Mich.

2 to 5 p. m.

"Bronchoscopic Cases of Dental Interest"
By Chevalier Jackson (M.D.).....
.....Philadelphia, Pa.
Willis F. Manges....Philadelphia, Pa.
A. L. Midgley.....Providence, R. I.



Palace of Fashions, which will house exhibits of wearing apparel and textiles during the Sesquicentennial.

TUESDAY, AUGUST 24

9 a. m. to 12 m.

"Instruments and Instrumentation"
By R. D. Thornton.....Richmond, Va.
John J. Travis.....Ann Arbor, Mich.
J. Ben Robinson.....Baltimore, Md.

"Selection of Filling Materials"
By A. E. Webster.....Toronto, Canada
Prof. W. H. Gilmour.....
.....Liverpool, England
R. D. Thornton.....Richmond, Va.

"Gold and Its Alloys for Inlays"
By F. V. Simonton San Francisco, Calif.

"Occlusion in Operative Dentistry"
By George T. Williams....Seattle, Wash.

"The Most Sensitive Areas of the Teeth and Their Operative Treatment"
By Charles F. Bodecker, L. M. Waugh and LeRoy L. Hartman..New York City

"Minimizing of Pain"
By William P. Smedley.....Denver, Colo.
E. H. Bruening.....Omaha, Nebr.

WEDNESDAY, AUGUST 25

9 a. m. to 12 m.

"Enamel Margins for Fillings"
By John F. Stephan .....Cleveland, Ohio
C. N. Johnson .....Chicago, Ill.
W. D. Tracy.....New York City

"Preventive Dentistry"
By Wallace Seccombe ... Toronto, Canada
Arthur L. Walters ... Tulsa, Okla.
John G. Hildebrand ... Waterloo, Iowa

"The Cast Gold Inlay"
By L. B. Morris ... Denver, Colo.

2 to 5 p. m.

"Thymol-Cement as a Cavity Filling"
By Prof. J. Jarzab ... Lwow, Poland

"Special Alloy"
By Dr. Mitsuru Okada ... Tokyo, Japan

"Stages of the Technic of High Speed Motors. Cavity Preparation Based on Experimental and Theoretical Study, with Special Reference to the Sensitivity of the Dentin and the Rhythm of Cavity Margins"
By Emile Huet ... Brussels, Belgium

"Protection of the Interproximal Space"
By Prof. J. W. Switters ... Utrecht, Holland

"Silicate Cements"
By Dr. M. Kulka ... Vienna, Austria

SECTION V: PARTIAL DENTURE PROSTHESIS (Including Crown and Bridge Work)

OFFICERS OF SECTION

President:
Hart J. Goslee ... Chicago, Ill.

Honorary Presidents:
Dr. Henri Villain ... Paris, France
Dr. William E. Cummer ... Toronto, Canada
Dr. Housset ... Paris, France
Prof. Dr. C. F. Pfaeffli ... Geneva, Switzerland
Prof. Dr. Carl Fritsch ... Frankfort-on-the-Main, Germany
Dr. H. Ganz ... Prague, Czechoslovakia
Dr. Luis Subirana ... Madrid, Spain
Dr. Pedro Labarco Hubertson, Chili, S. A.
Dr. Sergis Cabrera ... Bello, Peru, S. A.
Charles L. Alexander ... Charlotte, N. C.
F. E. Roach ... Tampa, Fla.
Forrest H. Orton ... San Francisco, Calif.

Vice-Presidents:
E. T. Tinker ... Minneapolis, Minn.
James Kendall Burgess ... New York City
William H. Elliott ... Detroit, Mich.

Secretaries:
Ellison Hillyer ... Brooklyn, N. Y.
C. S. Tuller ... New Orleans, La.

FOREWORD

The officers of Section V feel that partial denture prosthesis, including crown and bridgework, embraces a very important field in the science and art of dentistry, and have put forth every effort to build a program in every way fittingly expressive of the progress and advancement which has been made along these lines. The program offered, while perhaps not yet entirely complete, is nevertheless representative of every part of the world, and expressive of the best and most rational thought of the leading minds of today. To our foreign guests who pay us the honor of their presence, and of their valued contributions, we extend homage, together with assurances of our keen and deep appreciation, and of our warmest welcome and best wishes. To those of our own members who have so willingly and cheerfully aided in building and contributing to this program, we extend our grateful thanks for their prompt response to the call, and for their loyal support.

HART J. GOSLEE.

MONDAY, AUGUST 23

10 a. m. to 12 m.

President's Address

Discussed by
Rea Proctor McGee ... Pittsburgh, Pa.

"Partial Denture Prosthesis"
By Georges Villain ... Paris, France
Discussed by
G. Walter Dittmar ... Chicago, Ill.

"Crown and Bridgework in Czechoslovakia"
By H. Ganz ... Prague, Czechoslovakia
Discussed by
William D. Tracy ... New York City

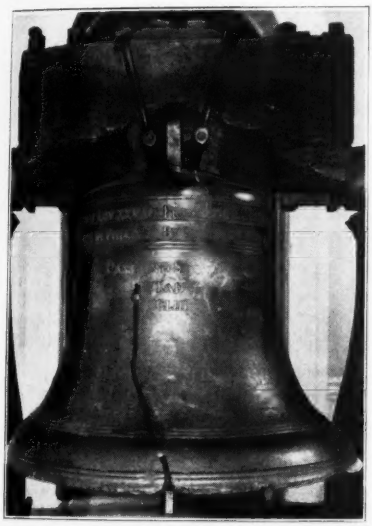
"Design and Construction of Unilateral Partial Dentures"
By Masakata Yazaki ... Tokyo, Japan
Discussed by
Edward Kennedy ... New York City

2 to 5 p. m.

"Some Considerations on Fixed and Removable Bridgework" (In Spanish)
By E. L. Crabb ... Havana, Cuba
Discussed by
C. Victor Vignes ... New Orleans, La.

"Determining Future Types of Crown and Bridgework by a Scientific Knowledge of Supporting Tissues"
By T. A. Hardgrove ..... Fond du Lac, Wis.
Discussed by
Frederick B. Noyes ..... Chicago, Ill.
William Hopkinson ..... Milwaukee, Wis.

"Some Basic Facts out of the Dual Individuality of the Human Denture and Their Relation to Success and Failure in Bridgework"
By James Kendall Burgess ..... New York City



The Liberty Bell, whose ringing announced the signing of the Declaration of Independence, July 4, 1776.

Discussed by
Ellison Hillyer ..... Brooklyn, N. Y.
John Oppie McCall ..... New York City

"Conservatism in Bridgework"
By W. D. N. Moore ..... Chicago, Ill.
Discussed by
Marcus L. Ward ..... Ann Arbor, Mich.

"Some Important Changes in the Practice of Bridgework"
By F. B. Vedder ..... Ann Arbor, Mich.
Discussed by
A. J. Irving ..... New York City

TUESDAY, AUGUST 24

9 a. m. to 12 m.

"A Modern Conception of Proper Bridge Attachments for Vital Teeth"
By K. W. Knapp ..... Minneapolis, Minn.
Discussed by
Stanley D. Tylman ..... Chicago, Ill.
J. M. Prime ..... Omaha, Nebr.

"A Consideration of Some Important Factors in Partial Denture Prosthesis"
By Norman B. Nesbitt ..... Boston, Mass.
Discussed by
H. F. Methven ..... Chicago, Ill.

"The Use of Cast Gold Inlays as Bridge Abutments"
By R. H. Volland ..... Iowa City, Iowa
Discussed by
J. V. Conzett ..... Dubuque, Iowa

"The Balancing Principle in Partial Dentures and Bridgework as Distinguished from Full Dentures"
By Joseph Homer ..... New York City
Discussed by
John H. Hospers ..... Chicago, Ill.

"Preparation of a Vital Tooth for a Porcelain Jacket Crown" (Illustrated in detail by moving pictures)
By H. Spalding Both ..... New York City
Discussed by
W. D. Tracy and William A. Squires ..... New York City

2 to 5 p. m.

CLINICAL MATINEE

Tuesday afternoon from 2:00 to 5:00 will be devoted entirely to a general clinic at which all of the essayists of Section V will be given an opportunity to illustrate papers by means of table clinic demonstrations.

WEDNESDAY, AUGUST 25

9 a. m. to 12 m.

"Clinical and Radiographic Observations on Fixed and Semifixed Bridgework"
By Stanley D. Tylman ..... Chicago, Ill.
Discussed by
Otto G. Krause ..... Milwaukee, Wis.

"Crown and Bridgework in General Practice"
By Carlisle C. Bastian ..... New York City
Discussed by
Oscar J. Chase ..... New York City

"The Service Rendered by Fixed Bridgework"
By R. J. Rinehart.....Kansas City, Mo.
Discussed by
E. H. Hubbuch.....Louisville, Ky.

"A Consideration of Fixed Bridge Restorations; Their Indications, Limitations and Construction"
By A. O. Klaffenbach...Iowa City, Iowa
Discussed by
Robert E. MacBoyle.....Chicago, Ill.

"Partial Denture Construction"
By Edward Kennedy.....New York City
Discussed by
Polk E. Akers.....Chicago, Ill.
A. L. Mulford.....Philadelphia, Pa.

2 to 5 p. m.

"Fixed Bridgework with Special Reference to Porcelain Pontics, Where the Supporting Metal Member Does Not Come in Contact with the Mucosa"
By E. E. Haverstick.....St. Louis, Mo.
Discussed by
W. A. Coston.....Kansas City, Mo.
George B. Scott.....St. Louis, Mo.
E. H. Bruening.....Omaha, Nebr.

"A Consideration of the Essentials of Avoiding Trauma in Partial Dentures, Including a Form of Hand-Made Joint"
By S. H. McAfee.....New Orleans, La.
Discussed by
S. S. Grosjean.....New Orleans, La.

"A Simple, Somewhat Condensed, Practical and Accurate Technic for Partial Denture Construction"
By K. K. Cross.....Denver, Colo.
Discussed by
Charles L. Alexander...Charlotte, N. C.
Arthur H. Brown.....Denver, Colo.

"Balanced Occlusion in Bridgework and the Detailed Steps in the Construction of a Removable Bridge"
By L. W. Doxtater.....New York City
Discussed by
Forry R. Getz.....New York City

"Sectional Impression Technic"
By M. B. Rudd.....Richmond, Va.
Discussed by
A. L. LeGro.....Detroit, Mich.
F. E. Roach.....Tampa, Fla.

THURSDAY, AUGUST 26

9 a. m. to 12 m.

"Structural Variations of Alveolar Bone Under Removable and Fixed Restorations"
By S. M. Weaver.....Cleveland, Ohio
Discussed by
H. W. MacMillan.....Cincinnati, Ohio

"Bridge Abutments on Vital Teeth"
By J. Russell Mitchell.....Atlanta, Ga.
Discussed by
Delos L. Hill.....Atlanta, Ga.

"Partial Denture Design"
By Hugh McWilliams Philadelphia, Pa.
Discussed by
Frank A. Fox.....Philadelphia, Pa.

"Partial Denture Construction from an Engineering Point of View Based upon the Physiologic Requirements"
By Arthur P. Little.....St. Paul, Minn.
Discussed by
G. E. Cleophas.....Beloit, Wis.
I. L. Furnas.....Cleveland, Ohio

"Occlusal Correction in the Construction of Fixed and Removable Partial Restorations"
By Harry G. Morton...Milwaukee, Wis.
Discussed by
J. W. Crawford.....Milwaukee, Wis.

2 to 5 p. m.

"Application and Construction of Removable Bridgework by Means of Single Unit Castings"
By Polk E. Akers.....Chicago, Ill.
Discussed by
F. van Minden.....Chicago, Ill.

"Porcelain Jacket Crowns, Field of Usefulness and Details of Construction"
By Hugh Avary...San Francisco, Calif.
Discussed by
Nye W. Goodman...Los Angeles, Calif.
William D. Vehe...Minneapolis, Minn.

"Efficient and Economical Partial Dentures in Simplified Types"
By Edwin H. Mauk.....
.....San Francisco, Calif.
Discussed by
William E. Cummer...Toronto, Canada

"Truncated Cone Versus Mandibular Movement"
By F. W. Frahm ..... Los Angeles, Calif.

Discussed by
Russell W. Tench ..... New York City
R. O. Schlosser ..... Chicago, Ill.

"Stationary or Removable Bridges"
By E. Steinschneider ..... Vienna, Austria

Penn Athletic Club.

SECTION VI: FULL DENTURE PROSTHESIS

OFFICERS OF SECTION

President:
Charles Lane ..... Detroit, Mich.

Honorary Presidents:
Dr. A. Gysi ..... Zurich, Switzerland
Dr. W. J. Tuckfield ..... Australia
Dr. Marcelino Weiss ..... Havana, Cuba
Prof. Dr. Hermann Schroder ..... Berlin, Germany
Dr. Enrique Gomez ..... Mexico
J. Leon Williams ..... New York City
Rupert E. Hall ..... Chicago, Ill.
George S. Monson ..... St. Paul, Minn.

Vice-Presidents:
Dayton Dunbar Campbell Kansas City, Mo.
M. M. House ..... Kansas City, Mo.
R. R. Gillis ..... Hammond, Ind.

Secretaries:
E. B. Owen ..... St. Louis, Mo.
J. W. Crawford ..... Milwaukee, Wis.

FOREWORD

Our objective in the construction of the program of Section VI has been to represent full denture construction as nearly as is possible. We believe that which is good must, "Take its place in the sun," and we live in hope that many occasions may present for the exposition of that which is of value and which is not here recorded. The first two days are devoted to essays and reports, which owing to the number to be presented must be confined to one half hour each. The last two days will be devoted to clinics, so that these essayists and others may demonstrate their subject matter.

CHARLES LANE.

MONDAY, AUGUST 23

10 a. m. to 12 m.

"The Application of the Spherical Principles of Occlusion in Full Dentures"
By H. B. Washburn ..... St. Paul, Minn.

"Esthetics and Denture Construction"
By M. M. House ..... Kansas City, Mo.

"Mandibular Movements and Occlusion"
By John W. Needles ..... Pueblo, Colo.

"Compound Impressions"
By F. M. Hight ..... Houston, Texas

"The Influence of Speech Habits. Reproduction of Expression on the Arrangement of Teeth in Full Artificial Dentures"
By Russell W. Tench ..... New York City

"Architectural Bone Changes of Face and Cranium"
By George S. Monson ..... St. Paul, Minn.

2 to 5 p. m.

"Condylar Adjustment—A Simplified Equipment and Accurate Method for Its Use in the Teaching and Practice of Full Denture Construction"
By W. H. Wright ..... Pittsburgh, Pa.

"Fundamentals in the Reproduction of Mandibular Movements in Edentulous Mouths"
By George P. Phillips ..... Boston, Mass.

"A Summary of the Development of the Articulator. A Summary of the Delevopment of the Metal Base Dentures"
By Rupert E. Hall ..... Chicago, Ill.

"A New and Simplified Method of Constructing Vulcanite Dentures"
By Charles L. Alexander ..... Charlotte, N. C.

TUESDAY, AUGUST 24

9 a. m. to 12 m.

"The Casting of Dentures"
By Keiichi Horie ..... Tokyo, Japan

"Denture Impressions Under Controlled Pressure"
By Arthur H. Brown ... Denver, Colo.

"The Dental Radiogram—Its Importance to the Prosthodontist"
By Howard H. Jackson ... Detroit, Mich.

"The Dentist's Responsibility for Patient's Care of Dentures"
By Henry W. Gillett ..... New York City

"Registration of Mandibular Movements with Plastic Material"
By W. A. Giffen ..... Detroit, Mich.

"Principles of Articulation"
By Alfred Gysi ... Zurich, Switzerland

2 to 5 p. m.

"A Study of the Dental Arch Forms of Japanese Races"
By Mitsuru Okada ..... Tokyo, Japan

"Human Dental Mechanism—Articulation in Prosthesias (Physiologic Method of Taking the Bite)"
By Georges Villain ..... Paris, France

"The Line of Occlusion or the Line of the Dental Arch"
By Marcellino Weiss ..... Havana, Cuba

"Sterilization of Full Dentures"
By J. Meyer ..... Paris, France

"Kinematics of Mandible"
By B. R. Bakker ..... Utrecht, Holland

WEDNESDAY, AUGUST 25

9 a. m. to 12 m.

CLINICS

"The Radiogram as an Aid to the Prosthodontist" (A presentation of dry specimens showing conditions of the cortical layer. Radiograms of these will be presented so that comparison may be made with radiograms from patients illustrating similar conditions)
By Howard H. Jackson ... Detroit, Mich.

"Method of Reproducing Mandibular Movements in Full Denture Cases"
By George P. Phillips ..... Boston, Mass.

"A Demonstration of Accurate Methods of Teaching and Practicing Full Denture Construction"
By W. H. Wright ..... Pittsburgh, Pa.

"Registration of Mandibular Movements with Plastic Material"
By W. A. Giffen ..... Detroit, Mich.

"Instructing Patients in the Care of Dentures and Bridges"
By Henry W. Gillett ... New York City

"A New and Simplified Method of Constructing Vulcanite Dentures"
By Charles L. Alexander ..... Charlotte, N. C.

"A Summary of the Development of the Articulator"
By Rupert E. Hall ..... Chicago, Ill.

"Principles of Articulation"
By Alfred Gysi ..... Zurich, Switzerland

2 to 5 p. m.

Clinics will be presented by operators of other nations.

THURSDAY, AUGUST 26

9 a. m. to 12 m.

"The Theory of Articulation and Mandibular Movement"
By Russell W. Tench ... New York City

"Mechanical Arrangement of Posterior Teeth"
By Victor H. Sears ..... New York City

"The Palladium Alloy Base Plates. Its Advantage and the Technic for Its Construction"
By W. J. Pryor ..... Cleveland, Ohio

"Checking and Adjusting Dentures for Resilient Tissue"
By A. Alfred Nelson ..... Detroit, Mich.

"Selecting Teeth for the Edentulous Case"
By Edward H. Bruening ... Omaha, Nebr.

"Compound Impression"
By F. M. Hight ..... Houston, Texas

"Another Articulating Device"
By Arthur H. Brown ..... Denver, Colo.

2 to 5 p. m.

"Impressions; Preparing the Casts; Fitting the Base Plates; Constructing the Occlusal Rims; Technic for Balancing in the Mouth; Transfer for Balanced Relation-

Officers of the Section on Periodontia, Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

ship by the Use of the Transfer Bow and Equalizing Wax; Mounting on the Instrument; Securing Central Occlusion; Setting up the Teeth (Esthetics and Stability); Finishing the Case and the Final Grind-In"
By George S. Monson ..... St. Paul, Minn.
William Denton Taylor ..... Newark, N. J.
J. W. McConnell ..... Pittsburgh, Pa.
Charles H. Jamieson ..... Frederic, Wis.
H. B. Washburn ..... St. Paul, Minn.

"Complete Technic of Denture Construction"
By M. M. House ..... Kansas City, Mo.

"Studies of Occlusion"
By J. W. Needles ..... Pueblo, Colo.

"Bridgework in Coordination with Dentures"
By Leo S. Johnston ..... Louisville, Ky.

"Continuous Gum Dentures"
By Dayton D. Campbell ..... Kansas City, Mo.

"Gold Dentures"
By Harry E. Holaday ..... Kansas City, Mo.

SECTION VII: EXODONTIA, ANESTHESIA AND ROENTGENOLOGY

OFFICERS OF SECTION

President:

J. F. Biddle ..... Pittsburgh, Pa. (Deceased)

Acting President:

R. Boyd Bogle ..... Nashville, Tenn.

Honorary Presidents:

Dr. William Guy ..... Edinburgh, Scotland
Prof. Dr. Guido Fischer ..... Hamburg, Germany
Prof. A. Cieszynski ..... Lwow, Poland
Prof. Dr. Hans Seidel Marburg, Germany
Dr. Blas Rocafort ..... Havana, Cuba
Dr. George J. Baudoux ..... Brussels, Belgium
Dr. Gerard Maurel ..... Paris, France
Dr. B. Mayerhofer ..... Vienna, Austria
Dr. Carlos Occelli ..... Mexico
Dr. Miegeville ..... Paris, France
Dr. Pedro Gracia M. ..... Mexico
Dr. Paulino Franco ..... Colombia, S. A.
C. Edmund Kells ..... New Orleans, La.
George B. Winter ..... St. Louis, Mo.

Vice-Presidents:

Howard R. Raper ..... Albuquerque, New Mexico
Horace M. Davis ..... Baltimore, Md.
H. A. Maves ..... Minneapolis, Minn.

Secretaries:

A. L. Frew ..... Dallas, Texas
William J. McKinley ..... Philadelphia, Pa.

FOREWORD

The gathering of representatives of the dental profession from all parts of the world to attend and contribute to the success of the Seventh International Dental Congress will make it the largest and most important meeting in dental history. Presentation of papers from members of the profession in the United States and abroad will record the achievements and advancement of professional activities. The officers of this section desire to express their sincere appreciation to those who have so willingly contributed to the program. They have made it possible a program of value to all interested in exodontia, roentgenology and anesthesia. The gathering of the foremost scientists and practitioners, who will take part in its deliberations, will make enviable history for dentistry. It is hoped that the profession at large will avail themselves of the rare opportunity to attend a meeting of such magnitude and importance.

R. Boyd Bogle.

MONDAY, AUGUST 23

10 a. m. to 12 m.

Address of the Acting President
By R. Boyd Bogle ..... Nashville, Tenn.

"Roentgen-Ray Burns"
By C. Edmund Kells ..... New Orleans, La.
Discussed by
Thomas P. Hinman ..... Atlanta, Ga.

"Radiology"
By Dr. Scherbel ..... Leipzig, Germany

"The Progress of Dental Radiography in Cuba"
By Dr. Blas Rocafort ..... Havana, Cuba

2 to 5 p. m.

"Physical Examination of Patients Before Extraction of Teeth Under General Anesthetics"
By Lawrence Curtis ..... Philadelphia, Pa.

"General Anesthesia"
By Prof. William Guy ..... Edinburgh, Scotland

"Ethylene Anesthesia in Dental Surgery"
By Edward L. Moravec ..... Cedar Rapids, Iowa

"Nitrous Oxid-Oxygen Anesthesia"
By Charles K. Teter ..... Cleveland, Ohio

TUESDAY, AUGUST 24

9 a. m. to 12 m.

"The Relationship of the Teeth to the Maxillary Sinus; Anatomic Factors Underlying the Diagnosis and Surgery of This Region" (Illustrated)
By Hugh W. MacMillan ..... Cincinnati, Ohio

"Relationship of the Teeth to the Mandibular Canal and the Maxillary Sinus"
By Thestle T. Job and Ralph H. Fouser ..... Chicago, Ill.

"Exodontia"
By C. R. Grissinger ..... Pittsburgh, Pa.

"Position of the Head of the Patient According to the Plane of the Direction of Piercing the Needle in Deep Injections into the Trifacial Nerve"
By Prof. A. Cieszynski ..... Lwow, Poland

"Periseronitis or the Difficult Dentition of the Third Molar"
By Shirokuro Endo ..... Tokyo, Japan

2 to 5 p. m.

"Radiographic Interpretation of the Various Types of Impacted Mandibular Third Molar, from Which a Definite Operative Technic Can Be Analyzed"
By Frank W. Rounds ..... Boston, Mass.

"Operative Technic for the Removal of the Various Types of Impacted Mandibular Third Molar. The results of ten years' research. (Lantern slide illustrations made from original drawings by the artist, Tom Jones, detailing the operative procedure for vertical, mesioangular, distoangular, horizontal, buccoangular, linguoangular and complete lingual types of impaction)"
By George B. Winter ..... St. Louis, Mo.

"Postoperative Treatment After the Removal of the Impacted Mandibular Third Molar"
By George C. Fahy ..... New Haven, Conn.

WEDNESDAY, AUGUST 25

9 a. m. to 12 m.

"The Value of the Radiogram in General Practice"
By Howard R. Raper ..... Albuquerque, N. M.

"The Value of the Radiogram in Root Canal Therapy"
By Harry B. Johnston ..... Atlanta, Ga.

"The Value of the Radiogram in Exodontia"
By Frederick F. Molt ..... Chicago, Ill.

"The Possibilities of the Radiographic Diagnostic Difficulties and Errors"
By Prof. Dr. Wilhelm Dieck ..... Berlin, Germany

"Implantation and Healing-In of Foreign Matter" (With roentgen-ray projection of clinical cases)
By E. P. Weigele ..... Leipzig, Germany

"Implantation Attempts"
By Dr. G. Stein ..... Vienna, Austria

2 to 5 p. m.

"The Value of the Roentgen Ray in Oral Diagnosis"
By Clarence O. Simpson ..... St. Louis, Mo.

"The Value of the Roentgen Ray in Oral Surgery"
By Robt. H. Ivy and Leroy M. Ennis ..... Philadelphia, Pa.

"The Value of the Roentgen Ray in Orthodontia"
By L. W. Waugh ..... New York City

"The Roentgen Ray in the Diagnosis and Prognosis of Periodontal Lesions"
By John Oppie McCall ..... Buffalo, N. Y.

"The Status of Mouth Preparation for Denture Construction"
By M. M. House ..... Kansas City, Mo.

THURSDAY, AUGUST 26

9 a. m. to 12 m.

"The Problem of Root Resection"
By F. B. Moorehead ..... Chicago, Ill.

"Apicoectomy"
By Chalmers J. Lyons Ann Arbor, Mich.

"The Pathology of the Maxillary Sinus and Its Management from the Dental Oral Surgeon's Point of View"
By T. A. Hardgrove Fond du Lac, Wis.

"Some Systemic Aspects of Periodontal Disease" (Illustrated)
By Herman R. Osgood ..... Boston, Mass.

2 to 5 p. m.

"The Internal Anatomy of the Mandible and Maxillae, with Special Reference to Local Anesthesia"
By L. Wallace Ohl ..... Pittsburgh, Pa.

"Local Anesthetics"
By F. N. Doubleday ... London, England

"Probable Anomalies of the Maxilla"
By Dr. Pedro Gracia M. ... Mexico

"Extraction of the Third Molar"
By Carlos Occelli ... Mexico

SECTION VIII: ORTHODONTIA

OFFICERS OF SECTION

President:
B. E. Lischer ... St. Louis, Mo.

Honorary Presidents:
Prof. Dr. R. Schwarz ... Basel, Switzerland
Dr. Jose J. Rojo ... Mexico
Dr. Orosman Lopez ... Havana, Cuba
Privatdocent Dr. Paul Simon ... Berlin, Germany
Dr. Jose Valderrana ... Madrid, Spain
Dr. Stanley Wilkinson ... Canterbury, Australia
Dr. Tacail ... Paris, France
Dr. Juan Manes ... Madrid, Spain
Dr. Quintero ... Lyons, France
Dr. Wilhelm Pfaff ... Leipzig, Germany
Dr. Rodolfo Tarrasido ... Argentine, S. A.
Edward H. Angle ... Pasadena, Calif.
Victor Hugo Jackson ... New York City

Vice-Presidents:
Frank M. Casto ... Cleveland, Ohio
H. A. Pullen ... Buffalo, N. Y.
O. A. Oliver ... Nashville, Tenn.

Secretaries:
L. M. Waugh ... New York City
Roscoe A. Day ... San Francisco, Calif.

FOREWORD

On behalf of the officers of the Congress and of Section VIII, I desire to express our grateful appreciation to all of the essayists, clinicians and discussors who have so freely consented to contribute to the program of the section, and our esteem for the profession at large for the opportunity of presenting a summary of orthodontic knowledge, and to extend cordial greetings to our colleagues in foreign lands. At a meeting of the officers of the section last September, it was deemed advisable to arrange the program in a manner which would present the present status of the specialty. The reader will note that the contributions scheduled for each session are closely related and devoted to a central theme. Thus, the practice of orthodontics is first considered, to be followed by reports on orthodontic education. Then, the etiology and diagnosis of dental anomalies are discussed, after which, office procedures are presented in various ways. Principles of treatment are followed by surgical orthodontics and, finally, methods of treatment are discussed in detail. While much of the matter to be presented is of a specialized nature, its principal purpose is to provide the dentist with a more comprehensive conception of the problems encountered in orthodontic service.

B. E. LISCHER.

MONDAY, AUGUST 23

10 a. m. to 12 m.

President's Address: "The Orthodontic Trend"

Discussed by
C. A. Hawley ... Washington, D. C.
W. R. Dinham ... Portland, Ore.

"The Value of Orthodontic Experience in General Practice"
By Alfred C. Lockett ... London, England

Discussed by
R. Ottolengui ... New York City
W. W. Woodbury ... Halifax, N. S.

"Some Ethical Phases of Practice"
By J. Lowe Young ... New York City

Discussed by
Lloyd S. Lourie ... Chicago, Ill.
Harold Chapman ... London, England

"Keeping One's Mind Open"
By Allen H. Suggett ... San Francisco, Calif.

Discussed by
Oscar Carrabine ... New York City
W. A. McCarter ... Topeka, Kan.

2 to 5 p. m.

"Professional Vocations and Graduate Study"
By William J. Gies ... New York City

"A University Curriculum for Graduate Orthodontics"
By Guy S. Millberry ... San Francisco, Calif.

"The Technical Training of the Orthodontist"
By Abram Hoffman ... Buffalo, N. Y.

"Orthodontics as a Professional Pursuit"
By Frank M. Casto ... Cleveland, Ohio

"Organizing Clinical Service to Meet Community Needs"
By Arthur D. Black ... Chicago, Ill.

General Discussion

Officers of the Section on Mouth Hygiene, Preventive Dentistry and Public Health, Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

TUESDAY, AUGUST 24

9 a. m. to 12 m.

"One of the Fundamental Factors Concerned in the Etiology of Dentofacial Deformities"
By Milo Hellman.....New York City
Discussed by
B. W. Weinberger.....New York City
Harvey Stallard.....San Diego, Calif.

"Indications for the Treatment of Malocclusion"
By Charles R. Baker.....Evanston, Ill.
Discussed by
R. C. Willett.....Peoria, Ill.
Max E. P. Ernst.....St. Paul, Minn.

"Radiographic Diagnosis of Difficult Dentition"
By Clarence O. Simpson.....St. Louis, Mo.
Discussed by
M. N. Federspiel.....Milwaukee, Wis.
W. H. Gilpatric.....Boston, Mass.

"Engineering in Orthodontic Diagnosis"
By F. L. Stanton.....New York City
Discussed by
Abram Hoffman.....Buffalo, N. Y.
Norman L. Hillyer.....Brooklyn, N. Y.

"Orthodontic Diagnosis"
By Paul W. Simon.....Berlin, Germany
Discussed by
A. H. Suggett.....San Francisco, Calif.
C. A. Hawley.....Washington, D. C.

"Further Gnathostatic Research; The Importance of the External Orbital Plane"
By A. Cieszynski.....Lwow, Poland

2 to 5 p. m.

"Office Organization"
By Joseph D. Eby.....New York City
Discussed by
B. G. DeVries.....Minneapolis, Minn.
T. G. Duckworth.....San Antonio, Texas

"Office Records"
By C. W. B. Wheeler.....New York City
Discussed by
F. A. Delabarre.....Boston, Mass.
O. W. Brandhorst.....St. Louis, Mo.

"Office Treatments"
By Ralph Waldron.....Newark, N. J.
Discussed by
S. P. Cameron.....Philadelphia, Pa.
W. E. Flesher.....Oklahoma City, Okla.

"Laboratory Methods"
By Ernest N. Bach.....Toledo, Ohio
Discussed by
J. E. Johnson.....Louisville, Ky.
H. D. Keeler.....Des Moines, Iowa

"The Utilization of Orthodontic Methods to Prevent Denture Maldevelopment"
By A. C. Rohde.....Milwaukee, Wis.
Discussed by
J. B. Kohagen.....Duluth, Minn.
F. C. Rodgers.....St. Louis, Mo.

"Improved Model Anchor Bands and Band Material"
By A. Edel.....Amsterdam, Holland

WEDNESDAY, AUGUST 25

9 a. m. to 12 m.

"A Résumé of Our Knowledge of Tissue Changes Caused by Orthodontic Tooth-Movement"
By L. M. Waugh.....New York City
Discussed by
Martin Dewey and Charles F. Bodecker.....New York City

"A Radiographic Study of Orthodontic Tooth-Movement"
By A. H. Ketcham.....Denver, Colo.
Discussed by
O. W. White.....Detroit, Mich.
Hardy G. Bean.....Toronto, Canada

"Developments in Electrometallurgy of Interest to the Dental Profession"
By Reginald V. Williams.....Buffalo, N. Y.
Discussed by
F. R. Blumenthal.....Boston, Mass.
C. M. McCauley.....Los Angeles, Calif.

"Cephalometry and Orthodontia"
By Prof. R. Schwarz.....Basel, Switzerland

"Occlusion and Articulation in Orthodontics"
By Georges Villain.....Paris, France
Discussed by
Martin Dewey.....New York City
F. T. Murless.....Hartford, Conn.

"Comparative Advantages of the Ribbon Arch"
By Orosman Lopez.....Havana, Cuba

2 to 5 p. m.

"Principal Forms of Third Molar Impactions"
By George B. Winter.....St. Louis, Mo.
Discussed by
H. E. Kelsey.....Baltimore, Md.
W. E. Stoft.....Omaha, Nebr.

"Surgical Procedures which Extend the Field of Dentofacial Orthopedics"
By M. N. Federspiel....Milwaukee, Wis.

Discussed by
Louis Schultz.....Chicago, Ill.
Chalmers J. Lyons.....Ann Arbor, Mich.

Case Reports from Practice

"Surgical-Orthodontic Correction of a Macro-mandibular Deformity"
By Louis Schultz.....Chicago, Ill.
R. C. Willett.....Peoria, Ill.

"Practical Demonstration"
By Paul W. Simon.....Berlin, Germany

THURSDAY, AUGUST 26

9 a. m. to 12 m.

"Some Fundamental Principles of Removable Appliances"
By V. H. Jackson.....New York City

"The Present Status of Lingual Appliances"
By Oren A. Oliver.....Nashville, Tenn.

"Recent Advances in Fixed Appliances"
By Henry C. Ferris.....New York City

"The Value of Fixed Attachments in Treatment Appliances"
By G. W. Grieve.....Toronto, Canada

"The Practical Simplification of Fixed Appliances"
By J. D. McCoy.....Los Angeles, Calif.

2 to 5 p. m.

"Special Studies in Orthodontia"
By Juan Manes.....Madrid, Spain

"The Treatment of Malocclusion in Adults"
By Thomas L. Grisamore....Chicago, Ill.

"Some Efficient Simplified Appliances"
By Lloyd S. Lourie.....Chicago, Ill.

"The Nonmechanical Treatment of Dentofacial Deformities"
By Alfred P. Rogers.....Boston, Mass.

"Present-Day Tendencies in Orthodontic Therapy"
By Herbert A. Pullen.....Buffalo, N. Y.

"Consideration of Certain Underlying Problems in Orthodontia"
By Jose J. Rojo.....Mexico

"The Treatment of Class II Cases"
By Dr. Moritz Tischler..Vienna, Austria

General Discussion

SECTION IX: MAXILLOFACIAL SURGERY AND SURGICAL PROSTHESIS

OFFICERS OF SECTION

President:
Henry S. Dunning.....New York City

Honorary Presidents:
Dr. Georges Villain.....Paris, France
Dr. W. Kelsey Fry.....London, England
Dr. Fulton Risdon.....Toronto, Canada
Dr. J. A. W. vanLoon.....Utrecht, Holland
Dr. B. Landete.....Madrid, Spain
Dr. A. Pont.....Lyon, France
Dr. Rubbrecht.....Brussels, Belgium
Dr. A. Meissner.....Warsaw, Poland
Prof. Dr. J. Jesensky.....Prague, Czechoslovakia
Prof. Dr. F. Bazant.....Prague, Czechoslovakia
Prof. Dr. F. Kostecka.....Prague, Czechoslovakia
Dr. H. Pichler.....Vienna, Austria
Dr. Delair.....Paris, France
Prof. Dr. Partsch.....Breslau, Germany
Truman W. Brophy.....Chicago, Ill.
Thomas L. Gilmer.....Chicago, Ill.

Vice-Presidents:
V. H. Kazanjian.....Boston, Mass.
M. N. Federspiel.....Milwaukee, Wis.
James Graham Sharp..San Francisco, Calif.
Robert H. Ivy.....Philadelphia, Pa.

Secretaries:
Leroy M. S. Miner.....Boston, Mass.
William L. Shearer.....Omaha, Nebr.

FOREWORD

Let us pause to consider what this great meeting means to us and the world. The war is over, "the tread of marching feet is stilled," blue sky prevails. It is summer again and we are once more turning our energies toward peace, happiness and the repair of wounds. I hope that all members and guests present and those absent will feel the warmth of our greeting. We Americans, your host, feel honored in having you visit our land. We appreciate deeply our responsibility in attempting to entertain you. We shall strive hard to make your visit to our shores worthwhile and to make you forget the many miles of travel that you have endured to be with us. Every nation in the world has learned much from the terrible suffering caused by the great conflict that

took place but a short time ago. World famous men from every country are here with us at this meeting and we are most anxious to know one another, to understand one another and to learn each from the other's experience. We are brothers, we are all striving for the same thing, the alleviation of suffering.

HENRY S. DUNNING.

WEDNESDAY, AUGUST 25

9 a. m. to 12 m.

President's Address

"Surgical Prosthesis"
By Dr. Georges Villain ... Paris, France

"Special Appliances for War Injuries Involving the Jaws"
By Dr. V. Guerini ... Naples, Italy

"A System of Fixation of Obturators"
By Miss J. G. Schiuringa ... Utrecht, Holland

"Prosthesis as an Aid to Surgery of Cleft Palate"
By W. Kelsey Fry ... London, England

"Report on Surgery of Cleft Palate and Cleft Lip. (*a*) Lip: Complete and Incomplete Clefts. (*b*) Palate: Complete and Incomplete Clefts" (With illustrations)
By Chalmers W. Lyons ... Ann Arbor, Mich.
William H. G. Logan ... Chicago, Ill.
Frederick B. Moorhead ... Chicago, Ill.
Truman W. Brophy ... Chicago, Ill.

Discussed by
George M. Dorrance (M.D.) ... Philadelphia, Pa.
Varaztad H. Kazanjian ... Boston, Mass.

2 to 5 p. m.

"Cysts of the Mandible and Maxillae: 1. Classification. 2. Diagnosis. 3. Treatment"
By Louis Schultz ... Chicago, Ill.
Morris I. Schamberg ... New York City
William L. Shearer ... Omaha, Nebr.
Herbert A. Potts ... Chicago, Ill.

Discussed by
Guy R. Harrison

"Osteitis of the Mandible and Maxillae: 1. Etiology. 2. Diagnosis. 3. Treatment of Acute and Chronic Stages"
By Harold S. Vaughan ... New York City
Matthew N. Federspiel ... Milwaukee, Wis.
Leroy M. S. Miner ... Boston, Mass.

"Facial Restorations"
By S. A. T. Coxon ... England

THURSDAY, AUGUST 26

9 a. m. to 12 m.

"Fractures of the Mandible: 1. Classification. 2. Diagnosis. 3. Treatment"
By Adolph Berger ... New York City
Carl W. Waldron ... Minneapolis, Minn.
Robert H. Ivy ... Philadelphia, Pa.

"Practical Methods of Orthopedic Treatment in Fractures of the Mandible"
By Prof. Alexander Linberg ... Leningrad, Russia

Discussed by
Thomas L. Gilmer ... Chicago, Ill.

"Facial Neuralgia, Original Treatment"
By Dr. B. Landete ... Madrid, Spain

"Unilateral Deformities of the Lower Jaw Due to Childhood Injuries"
By Varaztad H. Kazanjian ... Boston, Mass.

2 to 5 p. m.

"Principles of Plastic Surgery of the Face: 1. Types of Flap. 2. Preparation and Planning. 3. Methods of Transferring and Applying. 4. After-Care"
By Joseph E. Sheehan (M.D.) ... New York City
John S. Davis (M.D.) ... Baltimore, Md.
Ferris Smith (M.D.) ... Grand Rapids, Mich.
Clarence A. McWilliams (M.D.) ... New York City

"Plastic Surgery"
By H. D. Gillies ... London, England

"Temporomandibular Ankylosis: 1. Etiology. 2. Diagnosis. 3. Treatment"
By Fulton Risdon ... Toronto, Canada

"Method of Lengthening the Horizontal Part of the Mandible in Cases of Asymmetry, Caused by Unilateral Microgeny"
By Prof. Alexander Linberg ... Leningrad, Russia

"Surgery of the Temporomandibular Articulation"
By Leon Dufourmentel.....Paris, France
Leon Frison.....Paris, France

"Ankylosis of the Jaws, Original Treatment"
By Dr. B. Landete.....Madrid, Spain

"Surgical Correction of the Protrusion of the Upper Jaw"
By Dr. F. Kostecka
.....Prague, Czechoslovakia

"Surgical and Orthopedic Treatment of Prognathism and Micrognathia"
By Prof. Christian Bruhn.....Germany

"Plastic Surgery in Defects of the Mandible"
By Dr. Hans Pichler.....Vienna, Austria

SECTION X: PERIODONTIA

OFFICERS OF SECTION

President:
Paul R. Stillman.....New York City

Honorary Presidents:
Dr. Maurice Roy.....Paris, France
Dr. Leon Frison.....Paris, France
Dr. Eugene Dubeau.....Montreal, Canada
Prof. Dr. F. Egger.....Berne, Switzerland
Dr. A. E. Rowlett.....Leicester, England
Dr. A. J. McDonagh.....Toronto, Canada
Dr. Emil Schulz.....Prague, Czechoslovakia
Dr. Robert M. Fox.....Toronto, Canada
Dr. G. Aasgaard.....Bergen, Norway
Prof. Dr. Otto Loos
.....Frankfort-on-the-Main, Germany
Dr. Choquet.....Paris, France
Prof. Dr. Robert Neumann
.....Berlin, Germany
Dr. Victor A. Vera.....Paraguay, S. A.
J. D. Patterson.....Kansas City, Mo.
Austin F. James.....Chicago, Ill.
J. O. McCall.....Buffalo, N. Y.

Vice-Presidents:
C. H. Schott.....Cincinnati, Ohio
Clyde M. Gearhart.....Washington, D. C.
J. Herbert Hood.....Cleveland, Ohio

Secretaries:
Gillette Hayden.....Columbus, Ohio
Grace Rogers Spalding.....Birmingham, Mich.

FOREWORD

The Section on Periodontia will be the medium for the presentation of all available authentic information in the field of the diagnosis and treatment of periodontal disease. The horizon of knowledge in this branch of dental science has been broadening rapidly in late years. Dentists need no longer look on periodontoclasia as an incurable disease. The officers of this section believed that, under these circumstances, the least that they could do was to present a program which would accurately delineate every phase of this complex problem. It is not too much to say that such a program has been prepared. The officers of Section X extend a fraternal greeting to all who feel an interest in this subject.

Benjamin Franklin's grave.

Many distinguished visitors from foreign lands are to come for the purpose of presenting to the world through Section X their studies, based upon research. These and all other confréres visiting this country, we bid a cordial welcome. The information to be presented is authentic. The scientific aspects of the subject will be adequately presented. Treatment in all its phases, as practiced by those most successful in this field, will be fully described. Collateral subjects, dealing with sources of irritation to the periodontal tissues, will also receive due consideration. In short, no effort has been spared to provide a program complete from both the practical and the purely scientific standpoints.

PAUL R. STILLMAN.

MONDAY, AUGUST 23

10 a. m. to 12 m.

President's Address: "The Contribution of Periodontia to Preventive Dentistry"

"The Influence of the Growth of Bone on the Arrangement of Teeth and Its Relation to Periodontal Disease"
By Mr. J. G. Turner....London, England

"The Variation in Cell Response to Injury of the Periodontal Tissues"
By Benjamin Tishler.....Boston, Mass.
Discussed by
Arthur H. Merritt.....New York City

"Calculation of the Size of Gingival Pockets in Periodontoclasia"
By Prof. A. Cieszynski.....Lwow, Poland

"Ultraviolet Radiation"
By A. A. Rowlett.....Leicester, England
Discussed by
Frederick W. Lake.....Boston, Mass.

"Pyorrhea Alveolaris"
By Prof. Hans Seidel..Marburg, Germany

Dr. Widman's Surgical Treatment of Pyorrhea Alveolaris"
By Dr. G. Aasgaard.....Bergen, Norway

2 to 5 p. m.

"What is the Action of the Ameba in the Etiology of Pyorrhea Alveolaris"
By Prof. Dr. Mamlock Berlin, Germany
Discussed by
M. T. Barrett.....Philadelphia, Pa.

"Etiology of Pyorrhea"
By B. Gottlieb.....Vienna, Austria

"Research on the Etiology of Pyorrhea"
By F. V. Simonton....San Francisco, Calif.
Discussed by
Walter Adrion.....Berlin, Germany
Russell W. Bunting....Ann Arbor, Mich.
Edward H. Hatton .....Chicago, Ill.

"Pathology, Etiology and Treatment of Pyorrhea"
By Dr. F. L. Burnett.....
.....Buenos Aires, Argentina

"Radiographic Diagnosis of Rarefying Pericementitis Fibrosa"
By Robert M. Box.....Toronto, Canada
Discussed by
Howard R. Raper ...Albuquerque, N. M.

"Tissue Changes and Repair of Supporting Structures of the Tooth"
By Alfonse Lang.....Cincinnati, Ohio
Discussed by
Charles E. Sutton.....Toronto, Canada

"Etiology and Nature of Pyorrhea Alveolaris"
By Maurice Roy.....Paris, France

TUESDAY, AUGUST 24

9 a. m. to 12 m.

The Principles of Practice in Periodontia
"Examination and Case Records"
By Elmer S. Best.....Minneapolis, Minn.

"Etiology and Diagnosis"
By Thomas B. Hartzell.....
.....Minneapolis, Minn.

"Aims and Results of Periodontal Treatment"
By Austin F. James.....Chicago, Ill.

"The Sequence of Steps in Treatment"
By M. H. Garvin.....Winnipeg, Canada

"Root Surgery"
By Julian Smith.....Dallas, Texas

"Soft Tissue and Bone Surgery"
By F. W. Merrifield .....Chicago, Ill.

Correlation of reports by
Arthur H. Merritt .....New York City

2 to 5 p. m.

"The Clinical Significance of Atrophy of the Alveolar Process" (Illustrated)
By Hugh W. MacMillan.....
.....Cincinnati, Ohio
Discussed by
Paul R. Stillman.....New York City

"Experience with Inava Vaccine in the Treatment of Pyorrhea"
By Eudore Dubeau.....Montreal, Canada
Discussed by
I. Hirschfeld.....New York City

"The Indication for the Different Therapeutic Methods in the Treatment of Paradontosis"
By Dr. Hans Sachs .....Berlin, Germany

"Gingivectomy Versus Radical Operation"
By Prof. A. Cieszynski....Lwow, Poland

WEDNESDAY, AUGUST 25

9 a. m. to 12 m.

How the Factors of Irritation to the Periodontium May Be Eliminated in Dental Restorations

"Reducing Periodontal Irritation to a Minimum when Using Partial Restorations"
By Walter F. Chappelle....Buffalo, N. Y.

"Some Common Defects in Operative Restorations Which Contribute to the Injury of the Supporting Structures"
By Alvin Wesley Bryan..Iowa City, Iowa

"Functional Freedom Necessary for the Health of Abutment Teeth in Bridge and Saddle Restorations"
By Edward B. Spalding.....
.....Birmingham, Mich.

"Disturbance of Function of the Periodontal Tissues and Their Sequelae"
By James Kendall Burgess.....
.....New York City

"Reconstruction for Preventing Gingival Irritation of Especial Value in Periodontia"
By Theodore W. Maves..Cleveland, Ohio

"Moving Malposed Teeth into Proper Relation to Lines of Stress and Establishing a Balanced Occlusal Relation by Mechanical Restorations"
By O. DeForest Davis.....
.....Minneapolis, Minn.

Correlation of reports by
H. E. Friesell.....Pittsburgh, Pa.

THURSDAY, AUGUST 26

9 a. m. to 12 m.

Practical Measures Employed and the Management of Cases in Dental Prophylaxis

"The Dental Hygienist"
By E. Melville Quinby.....Boston, Mass.

"Oral Prophylaxis as Practiced—A Failure or a Success"
By Robin Adair.....Atlanta, Ga.

"Immunizing Mouth Tissues Both Hard and Soft to Infection by Correct Stimulation with the Toothbrush"
By W. J. Charters....Des Moines, Iowa

"Fundamentals of Dental Prophylaxis"
By Grace Rogers Spalding.....
.....Birmingham, Mich.

"The Value of Dental Prophylaxis and the Work of the Dental Hygienist in Preventive Dentistry"
By Harold J. Leonard.....
.....Minneapolis, Minn.

"The Value of Dental Prophylaxis in Early Childhood"
By M. Evangeline Jordon.....
.....Los Angeles, Calif.

"A Consideration of So-Called Periodontal Nomenclature"
By L. Pierce Anthony....Philadelphia, Pa.
Discussed by
Rodriguez Ottolengui....New York City
John Oppie McCall.....New York City
F. V. Simonton.....San Francisco, Calif.

"The Measure of Success in Periodontia Treatment"
By John Oppie McCall..New York City
Discussed by
Russell B. Macfarlane.....Boston, Mass.
Harold J. Leonard....Minneapolis, Minn.

2 to 5 p. m.

"The Importance of the Gingivae in Practical Dentistry"
By Dr. G. Lind....Amsterdam, Holland

"The Duty of the General Practitioner and of the School Dentist in the Prophylaxis of Dental Malpositions and Maxillary Malformations"
By Dr. Georges Villain.....Paris, France

"The Hygiene of the Mouth"
By Mildred W. Dickerson.....
.....Washington, D. C.
Discussed by
Anna V. Hughes and C. B. Fowlkes....
.....New York City

SECTION XI: MOUTH HYGIENE, PREVENTIVE DENTISTRY AND PUBLIC HEALTH

OFFICERS OF SECTION

President:

H. J. Burkhart.....Rochester, N. Y.

Honorary Presidents:

Prof. Dr. Ernst Jessen....Basel, Switzerland
Dr. A. L. J. C. VanHasselt.....
.....The Hague, Holland
Dr. George Kerr Thompson..Halifax, N. S.
Dr. Wallace Seccombe....Toronto, Canada

Dr. Walter Harrison ..... Brighton, England
Dr. Bousquet ..... Besanon, France
Dr. A. Piperno ..... Rome, Italy
Dr. John Nilsen ..... Oslo, Norway
Dr. J. S. Bruske ..... Amsterdam, Holland
Dr. C. Lind ..... Amsterdam, Holland
Dr. F. Trauner ..... Vienna, Austria
Dr. Kieffer ..... Strasbourg, France
Prof. Z. Urbanska-Filipowiczowa ..... Warsaw, Poland
Mr. Bryan J. Wood ..... London, England
Thomas Alexander Forsyth ..... Boston, Mass.
George Eastman ..... Rochester, N. Y.

Vice-Presidents:

Alfred C. Fones ..... Bridgeport, Conn.
Harold DeWitt Cross ..... Boston, Mass.
Herbert L. Wheeler ..... New York City
Charles H. Oakman ..... Detroit, Mich.

Secretaries:

Guy S. Millberry ..... San Francisco, Calif.
E. L. Pettibone ..... Cleveland, Ohio

FOREWORD

The president of this section, on behalf of the officers of the Congress, and his associates in the preparation of this program, takes this opportunity of extending a hearty welcome to those who, by their presence and contributions, will make a success of the aims and ideals of this section. It will be observed from the program that the activities of every department of Section XI have been covered, and papers and reports on the various divisions will be given by the leaders of the profession from abroad and in our own country. The Congress is to be congratulated upon the fact that they will have the opportunity of extending a personal greeting to many distinguished colleagues from other countries, who have done pioneer work and rendered outstanding service in mouth hygiene and preventive dentistry. It will be our endeavor to make their stay as enjoyable and pleasant as possible, and have them feel the warmth of our appreciation of their splendid service, covering in many cases a long period of years, under most trying and difficult circumstances. It is also a pleasure to express a word of deep appreciation to the members from our own country, whose names appear on the program, for their cooperation and assistance.

H. J. BURKHART.

TUESDAY, AUGUST 24

2 to 5 p. m.

President's Address

"Advantages and Disadvantages of Social Hygiene Institutions in Germany"
By Dr. Fritz Schaeffer-Stuckert ..... Frankfort-on-the-Main, Germany

"Considerations on Oral Hygiene from an International Standpoint: Summarizing Report on the Activities of the Hygiene Commission Fédération Dentaire Internationale"
By Dr. J. S. Bruske Amsterdam, Holland

"The Tasks and Aims of the Hygiene Commission of the Fédération Dentaire Internationale, with Proposals Passed by the Hygiene Commission in Session in Geneva, 1925"
By Prof. Dr. Ernst Jessen ..... Basel, Switzerland

"Oral Hygiene in Japan"
By Dr. Yoshio Mukai ..... Tokyo, Japan

WEDNESDAY, AUGUST 25

9 a. m. to 12 m.

"School Dentistry in Holland, Its System and Results"
By Dr. A. L. J. C. VanHasselt ..... The Hague, Holland

"Statistics of Dental Caries"
By Dr. Conrad Cohn ..... Berlin, Germany

"Industrial Dental Clinics in Great Britain"
By Dr. William H. Shipway ..... Bristol, England

"Industrial Dentistry"
By E. L. Pettibone ..... Cleveland, Ohio

"Prenatal and Preschool Dental Attention in Iowa Under the Sheppard-Towner Act"
By George H. Wandell Iowa City, Iowa

"Results of Eight Years of Oral Hygiene in the Public Schools of West Virginia"
By G. T. Epling ..... Welch, W. Va.

2 to 5 p. m.

"The Historical Development of Oral Hygiene"
By Prof. Dr. Ernst Jessen ..... Basel, Switzerland

Officers of the Section on Dental Education, Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

"Dental Hygiene in French Schools"
By Dr. A. Blatter.....Paris, France

"Conductive Lines on the Dental Treatment of Children"
By Dr. Tandlaege E. Haderup.....
.....Copenhagen, Denmark

"Dental Health Activities in Canada"
By Fred J. Conboy.....Toronto, Canada

"The Origin and History of the Dental Hygienists' Movement"
By A. C. Fones.....Bridgeport, Conn.

"The Treatment of Exposed and Pulpless Deciduous Teeth"
By Charles A. Sweet.....Oakland, Calif.

"The Care of Children's Teeth in the Schools of Poland"
By Dr. H. Allerhand.....Lwow, Poland

THURSDAY, AUGUST 26

9 a. m. to 12 m.

"Public and Academic Hygiene in Switzerland"
By Dr. F. Piguet....Geneva, Switzerland

"The Care of Children and Adults in Germany"
By Dr. Konrad Cohn....Berlin, Germany

"Common Dental Care in Norway"
By Dr. John Nilsen.....Oslo, Norway

"The Financing of School Clinics"
By Guy S. Millberry.....
.....San Francisco, Calif.

"Public Health"
By Richard A. Bolt.....Berkeley, Calif.

"The Dental Hygienist in Private Practice, in Public School Service and in Institutional Work"
By Edith M. Hardy.....Rochester, N. Y.

"Result of Thorough Dental Work by School Dental Clinics"
By Madelyn Williams.....Welch, W. Va.

12 m. to 2 p. m.
Oral Hygiene Luncheon

2 to 5 p. m.

"The Present State of Oral Hygiene in Japan"
By Dr. Mitsuru Okada.....Tokyo, Japan

"State Management of Mouth Hygiene"
By C. J. Hollister.....Harrisburg, Pa.

"The History of the Oral Hygiene Movement in Cleveland"
By Harris R. C. Wilson....Cleveland, Ohio

"The Training of the Dental Hygienist"
By Harold J. Leonard.....
.....Minneapolis, Minn.

"Children's Dentistry"
By M. Evangeline Jordon.....
.....Los Angeles, Calif.

"Dental Hygiene in the Health Program of the Public School"
By Charles H. Henshaw.....
.....Des Moines, Iowa

"Report of the Forsyth Dental Infirmary"
By Harold DeW. Cross.....Boston, Mass.

"Report of Rochester Dental Dispensary"
By Harvey J. Burkhart....Rochester, N. Y.

"Clinics and Demonstrations on Children's Dentistry'"
By T. P. Hyatt.....New York City
James M. Prime.....Omaha, Nebr.

Clinics and demonstrations by dental hygienists

Public Health Exhibit

SECTION XII: DENTAL EDUCATION

OFFICERS OF SECTION

President:
Thomas J. Barrett.....Worcester, Mass.

Honorary Presidents:
Dr. Floristan Aguilar.....Madrid, Spain
Dr. W. H. Gilmour....Liverpool, England
Dr. Konrad Cohn.....Berlin, Germany
Dr. Ch. F. L. Nord....The Hague, Holland
Dr. A. W. Thornton.....Montreal, Canada
Dr. Morinosuke Chiwaki.....Tokyo, Japan
Dr. John S. Burnett..Montevideo, Uruguay
Dr. M. Okada.....Tokyo, Japan
Dr. Augustin Larrauri.....Argentina
Dr. Santiago Sartori.....Uruguay
Nelville S. Hoff.....Ann Arbor, Mich.
Eugene H. Smith.....Boston, Mass.
John H. Kennerly.....St. Petersburg, Fla.
(Deceased)

Vice-Presidents:
F. T. Breene.....Iowa City, Iowa
Alfred Owre.....Minneapolis, Minn.
William Rice.....Boston, Mass.

Secretaries:
DeLos L. Hill.....Atlanta, Ga.
F. R. Henshaw.....Indianapolis, Ind.

FOREWORD

The officers of the Section on Education extend most cordial greetings, to each and all of the essayists contributing. They also desire to express their feelings of deep appreciation for the very valuable cooperation they have received from the leading dental educators in this and the many foreign countries that are represented on this exceptionally fine program.

The progress of dental education in this country during the past five years has been most remarkable and inspiring. Dentistry has become more effective in its methods of promoting health; more esthetic in its development of the fine arts; more cultural in its training and in its ability to inspire and develop higher ideals in its students. This development and improvement in dental methods and teaching has been brought about largely by the active work of the recognized dental schools, and the universities of which they are a part. They have had the active and able assistance as well as the sympathetic efforts of the national bodies to whom have been entrusted the dental educational problems. The deep interest and broad public appreciation of our professional endeavors to stimulate a closer relationship between clinical dentistry and clinical medicine merits at this time our best efforts, to hasten its accomplishment. No doubt wise counsel and inspiring methods to this end will be developed during this Congress and through this assemblage of the world's foremost dentists. To make dentistry the full health service equivalent of any other specialty of medicine is our primary duty. We feel that a word of appreciation is appropriate and particularly fitting at this time, before this Section on Education, to the Carnegie Foundation for the advancement of teaching and to their special representative, Dr. William J. Gies. This stimulus that dental education has received in the epoch-making effort to place dentistry on a plane of academic and scientific equality with any and all medical specialties has been the greatest forward step in all dental history. We feel that the gratitude of the entire dental world is due them for what has been accomplished. With our hearts filled with cordial good wishes we bid our guests from abroad a most hearty welcome and trust that much of educational value for our mutual progress and welfare will be the result of this Seventh International Dental Congress.

THOMAS J. BARRETT.

MONDAY, AUGUST 23

10 a. m. to 12 m.

President's Address

"The Eventful Dental Curriculum"
By Henry L. Banzhaf....Milwaukee, Wis.

"The Importance of Fine Art in Dental Education"
By William J. Gies.....New York City

"Comments on the Carnegie Survey of Dental Education"
By Alfred Owre.....Minneapolis, Minn.

2 to 5 p. m.

"Dental Health Education"
By Dr. William Guy.....
.....Edinburgh, Scotland

"Dental Education in England"
By Dr. William H. Gilmour.....
.....Liverpool, England

"Recent Progress in the Dental Legislation and Education in Japan"
By Dr. Morinosuke Chiwaki.....
.....Tokyo, Japan

"The Actual Condition of Dental Education in the World"
By Dr. Georges Villain.....Paris, France

TUESDAY, AUGUST 24

9 a. m. to 12 m.

"The Minimum Basic Training for the Practice of Medical Specialties, Including Dentistry"
By Guy S. Millberry.....
.....San Francisco, Calif.

"The Proportion of Medical and Dental Knowledge in the Dental Curriculum"
By Dr. C. F. L. Nord.....
.....The Hague, Holland

"Examinations of Psychotechnic Qualifications in Dental Students"
By Prof. Dr. Wilhelm Dieck.....
.....Berlin, Germany

"The Educational Council in the Colleges"
By Frederic R. Henshaw.....
.....Indianapolis, Ind.

2 to 5 p. m.

"Usefulness of the Course on Dental Instrumentation"
By Emile Huet ..... Brussels, Belgium

"Teaching of Preventive Dentistry to Undergraduates"
By George Kerr Thompson ..... Halifax, N. S.

"The Importance of Hygiene and Public Health in the Dental Curriculum"
By William Rice ..... Boston, Mass.

"Clinical Education for the Dental Student"
By E. A. Rogers ..... Iowa City, Iowa

"Exhibit of Educational Films of Animated Drawings Used in the Dental School of Paris"
By Dr. Georges Villain ..... Paris, France

SECTION XIII: DENTAL LEGISLATION

OFFICERS OF SECTION

President:
R. J. Rinehart ..... Kansas City, Mo.

Honorary Presidents:
Dr. F. Schaeffer-Stuckert ..... Frankfort-on-the-Main, Germany
Dr. Fourquet ..... Paris, France
Dr. Jesus T. Fregoso ..... Mexico
Dr. Marquis de los Delicias ..... Madrid, Spain
Dr. Fritz Linnert ..... Nurnberg, Germany
Dr. Ivar Krohn ..... Oslo, Norway
Dr. Brodhurst ..... LeVesinet, France
Dr. de Croes ..... Paris, France
Mr. J. H. Babcock ..... London, England
Dr. Augusto Coelhoe Souza ..... Brazil
Albert L. Midgley ..... Providence, R. I.
Homer C. Brown ..... Columbus, Ohio
T. A. Broadbent ..... Chicago, Ill.

Vice-Presidents:
G. Walter Dittmar ..... Chicago, Ill.
Frank O. Hetrick ..... Ottawa, Kan.
J. H. Baldwin ..... Louisville, Ky.

Secretaries:
H. C. McKittrick ..... Indianapolis, Ind.
W. F. Walz ..... Lexington, Ky.

FOREWORD

The Section on Dental Legislation desires, at this time, to express its profound gratitude to all essayists and speakers for their keen interest and willingness to serve in any capacity in order to make the Congress a success. Section XIII deals with a most important phase of our professional life. Law is the basis of all security and stability in every relation of our human experience, and dental legislation, therefore, means much to the members of our profession. In the program here presented, we have endeavored to cover every phase of the subject in a manner which would prove of the greatest interest to the members of the Congress.

R. J. RINEHART.

WEDNESDAY, AUGUST 25

9 a. m. to 12 m.

President's Address

"Uniformity of Dental Laws"
By Alphonso Irwin ..... Camden, N. J.
Discussed by
George L. Powers ..... Memphis, Tenn.
H. L. Wheeler ..... New York City

"Dental Legislation in Spain"
By Dr. Floristan Aguilar ..... Madrid, Spain

"The Public Dental Standard in Norway"
By Dr. Ivar Krohn ..... Oslo, Norway

2 to 5 p. m.

"Some Important Questions Which Should Be Considered in Connection with Proposed Legislation"
By Homer C. Brown ..... Columbus, Ohio
Discussed by
Clyde M. Gearhart ..... Washington, D. C.
Robert R. Gillis ..... Hammond, Ind.
H. Wood Campbell ..... Suffolk, Va.

"Legislation as Related to Dental Health in Public Schools and Institutions"
By Harris R. C. Wilson Cleveland, Ohio
Discussed by
William F. Whalen ..... Peoria, Ill.
Frank O. Hetrick ..... Ottawa, Kan.

"Advantages and Disadvantages of Social Hygiene Legislation in Germany"
By Prof. F. Schaeffer-Stuckert Germany

THURSDAY, AUGUST 26

9 a. m. to 12 m.

"Legislation to Regulate Dental Practitioners Operating Under Corporate Name"
By Thomas E. Purcell Kansas City, Mo.
Discussed by
G. Walter Dittmar ..... Chicago, Ill.
J. G. Hildebrand ..... Waterloo, Iowa

Officers of the Section on Dental Legislation, Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

"Legislation to Regulate All Advertising Dentists"
By T. A. Broadbent.....Chicago, Ill.
Discussed by
Guy S. Millberry.....San Francisco, Calif.
William F. Walz.....Lexington, Ky.

"General and Private Dental Organizations in Germany"
By Dr. A. Schelle.....Cassell, Germany

2 to 5 p. m.

"Legislation to Regulate Dental Hygienists"
By Harvey J. Burkhart.....Rochester, N. Y.
Discussed by
Hugh G. Tanzey.....Kansas City, Mo.
F. R. Henshaw.....Indianapolis, Ind.

"Advantages and Problems of National Reciprocity"
By Emory A. Bryant.....Charleston, S. C.
Discussed by
L. L. Barber.....Toledo, Ohio
M. D. Huff.....Atlanta, Ga.

"The Present State of the Dai Nippon Dental Association (The Japan Dental Association)"
By Dr. Mitsuru Okada.....Tokyo, Japan

"Jurisprudence"
By Dr. Gesus T. Fregoso.....Mexico

SECTION XIV: MILITARY SURGERY

OFFICERS OF SECTION

President:
Robert T. Oliver.....New York City

Honorary Presidents:
Dr. E. Hockenjos.....Basel, Switzerland
Prof. Dr. Christian Bruhn.....Dusseldorf, Germany
Dr. Boudy.....Paris, France
Dr. Bruschera.....Paris, France
Dr. Luis de la Barra Lastaria.....Chili
Emory A. Bryant.....Charleston, S. C.
James P. Harper.....St. Louis, Mo.
W. A. Heckard.....New York City

Vice-Presidents:
Rex H. Rhoades.....Washington, D. C.
H. E. Harvey.....Washington, D. C.
C. W. Mills.....Chillicothe, Ohio

Secretaries:
John L. Peters.....New York City
W. L. Darnall.....Washington, D. C.

MONDAY, AUGUST 23

10 a. m. to 12 m.

President's Address: "Military Dental Surgery"

"The Treatment of Gunshot Fractures of the Jaws, with Large Loss of Soft and Bony Tissue" (Illustrated)
By Fulton Risdon.....Toronto, Canada

"Radiography in the Face, Jaw and Dental Surgical Service of Military Hospitals in the Theater of Operations" (Illustrated)
By G. R. Harrison.....Richmond, Va.

"Orthodontic Principles in Military Dental Surgery" (Illustrated)
By Joseph D. Eby.....New York City

2 to 5 p. m.

"Military Training in Dental Education"
By Alfred Owre.....Minneapolis, Minn.

"Correction of Deformities of Face and Jaws Resulting from War Injuries" (Illustrated)
By Robert H. Ivy.....Philadelphia, Pa.

"Coordination of Dental and Medical Service in the Treatment of Battle Casualties"
By V. P. Blair.....St. Louis, Mo.

"Dental Service in the Zone of the Advance"
By C. F. McDonald.....New York City

"Dental Research Studies in the Army"
By F. E. Rodriguez.....Washington, D. C.

TUESDAY, AUGUST 24

9 a. m. to 12 m.

"Adaptation of Military Surgery to Civil Practice"
By Rea Proctor McGee.....Pittsburgh, Pa.

"War-Time Obligations of the American Dental Profession"
By Charles F. Ash.....New York City

"The Dental Service at Mobile and Evacuation Hospitals"
By W. C. Speakman.....Wilmington, Del.

"Dental Research Studies in the Navy"
By H. E. Harvey.....Washington, D. C.

"War Injuries to the Upper Part of the Face" (Illustrated)
By V. H. Kazanjian.....Boston, Mass.

2 to 5 p. m.

"Maxillofacial Surgical Teams; from the Point of View of a Dental Member"
By Leo Winter.....New York City

"Organization of Dentists in the Swiss Army"
By Prof. Dr. E. Hockenjos.....
.....Basel, Switzerland

Symposium—Reports on the Military Dental Service, by official representatives of six nations.*

SECTION XV: HISTORY, SCIENCE AND LIBRARIES

OFFICERS OF SECTION

President:
Alfred P. Lee.....Philadelphia, Pa.

Honorary Presidents:
Dr. Andres G. Weber.....Havana, Cuba
Dr. Emile Huet.....Brussels, Belgium
Mr. Robert Lindsay.....London, England
Mr. Bryan J. Wood.....London, England
Dr. V. Guerini.....Naples, Italy
Dr. Charles L. Bouvier.....
.....Geneva, Switzerland
Dr. Georges Viau.....Paris, France
Dr. Emil Steinschneider.....Vienna, Austria
Dr. Albert Joachin.....Brussels, Belgium
Dr. E. R. Aldecoa.....
.....Manila, Philippine Islands
Prof. Dr. W. Hess.....Zurich, Switzerland
Prof. Dr. Christian Greve.....
.....Erlangen, Germany
Edward C. Kirk.....Philadelphia, Pa.
William H. Trueman.....Philadelphia, Pa.
David M. Cattell.....San Francisco, Calif.

Vice-Presidents:
Abram Hoffman.....Buffalo, N. Y.
Edward C. Mills.....Columbus, Ohio
B. W. Weinberger.....New York City

Secretaries:
L. Pierce Anthony.....Philadelphia, Pa.
F. C. Friesell.....Pittsburgh, Pa.

*Representatives from the following nations have been formally invited: England, France, Italy, Canada, Spain, Cuba, and the United States; the latter through the three Government services: Army, Navy and Public Health. Their names, grade, service and country will appear later, as will the names of persons selected for discussion of the several papers.

FOREWORD

Section XV, on History, Science and Libraries, makes its initial bow to members of the Seventh International Dental Congress. While these subjects have, of course, received due consideration at previous meetings, this is the first time they have been so grouped and placed under one section. It seems fitting, perhaps, that this section should appear as the final one in the group of fifteen, inasmuch as history cannot be recorded until it has actually taken place, nor can libraries assume documentation until works have been written. A study of our preliminary program will show that we have been fortunate in securing what we believe to be a remarkable group of essayists, as regards, first, their scientific attainments, and second, the cosmopolitan character of the entire personnel. At least ten countries are represented, and each has delegated the man believed to be best qualified to present his particular subject. It is with great pleasure and pride that Section XV welcomes to its program the men of these various countries and we look forward with keen anticipation to being the hosts to these notable visitors. Our program to date includes seven papers dealing with general historical or scientific subjects; seven covering specifically the dental history of as many countries, and four reports from F. D. I. commissions on subjects embraced by the section.

ALFRED P. LEE.

WEDNESDAY, AUGUST 25

9 a. m. to 12 m.

President's Address

"The Practice of Dentistry and the Filipino Dentists"
By Dr. Eladio R. Aldecoa.....Manila, P. I.

"History of Public Dental Service in Great Britain"
By Messrs. Bryan J. Wood and Robert Lindsay.....London, England

"The Urgent Necessity of an International Stomatologic Index of Current Professional and Scientific Literature"
By Dr. Andres G. Weber..Havana, Cuba

2 to 5 p. m.

"The Decimal Classification Applied to Odontology"
By Dr. Emile Huet.....Brussels, Belgium

"The Beginning and International Growth of Dental Journalism"
By William H. Trueman ..... Philadelphia, Pa.

"Relation of the F. D. I. to International Dental Congresses"
By Prof. Dr. F. Schaeffer-Stuckert ..... Frankfort-on-the-Main, Germany

"The Dental Library—Its Past and Its Future"
By B. W. Weinberger ..... New York City

"History of Dentistry in England"
By Messrs. Leonard Matheson and Lewin Payne ..... London, England

THURSDAY, AUGUST 26

9 a. m. to 12 m.

"History of Dentistry in Germany"
By Prof. Dr. Christian Greve ..... Munich, Germany

"History of Dentistry in Belgium"
By Dr. Edmond Rosenthal ..... Brussels, Belgium

"History of Dentistry in Denmark"
By Dr. E. Haderup ..... Copenhagen, Denmark

"History of Dentistry in Switzerland"
By Dr. Charles L. Bouvier ..... Geneva, Switzerland

2 to 5 p. m.

"History of Dentistry in New Zealand"
By Dr. Richard Dunn ..... Wellington

"Report of the F. D. I. Commisison on Terminology"
By Louis Ottofy ..... Chicago, Ill.

"Report of the F. D. I. Commission on Scientific Research"
By Dr. B. Gottlieb ..... Vienna, Austria

"Report of the F. D. I. Commission on Documentation: The Organization of Dental Documentation"
By Emile Huet ..... Brussels, Belgium

"Index of the Periodical Dental Literature"
By Arthur D. Black ..... Chicago, Ill.

CLINIC PROGRAM

FRIDAY, AUGUST 27

(The Commercial Museum, with the exception of Surgical Clinics in Hospitals)

Herbert L. Wheeler, General Chairman ..... New York City

Otto U. King, Secretary ..... Chicago, Ill.

W. J. Robinson, Local Chairman ..... Philadelphia, Pa.

All clinics will be given on Friday from 9 a. m. to 12 m. and from 2 to 5 p. m. Clinicians in every instance have been selected by their respective State Advisory Committee for the Seventh International Dental Congress or by their dental school and will be grouped according to states and sections wherever facilities in the Commercial Museum will permit.

Each clinic will be listed with its location in the Commercial Museum and numbered in a way that the Committee on Local Arrangements believe will enable it to be most easily found.

Clinicians are expected, as far as possible, to furnish all necessary instruments and equipment.

No one will be allowed to take orders for, or to sell, instruments, materials or appliances in the clinic rooms.

Immediately on registering for the meeting, all clinicians should report for instructions at Clinic Headquarters in the Commercial Museum.

RULES OF THE CONGRESS GOVERNING CLINICS

STATE CLINICS

The State Advisory Committee for the Seventh International Dental Congress in each state has been assigned the responsibility of making a contribution in the form of a clinic. The rules and detailed information regarding the plans for these clinics are as follows:

1. Each state is to contribute twice as many clinics as it will have delegates in the 1926 House of Delegates of the American Dental Association.

2. Those states having more than two clinics under this plan may present one-third of their total in the form of group clinics.

3. Only table clinics will be accepted. No surgical or lecture clinics are to be furnished by the state advisory committees.

4. All state clinics from a state advisory committee must be ratified by a majority vote of the state advisory committee or a committee selected for this purpose.

5. Any expenses incident to securing the clinics are to be assumed by the state advisory committee.

6. Each clinician will be allotted a space of 56 square feet in which he will have a table (card table) and chair. There will be no elevated platforms.

7. No personal exploitation will be permitted in the clinics. In those cases in which a particular method is announced, the officers are authorized to change the wording to read "a method."

SCHOOL CLINICS

The Committee on Organization of the Seventh International Dental Congress has requested the Clinic Committee of the Seventh International Dental Congress to invite the dean of each dental school in the world to select clinicians from his teaching staff to demonstrate teaching methods of his institution. The character of the clinic is left to the discretion of the dean, but the number of clinicians shall not exceed eight.

Clinics will be limited to eight in number or two groups of four each or four groups of two each, or any other combination that does not exceed eight. All clinics will be confined to table demonstrations.

ALABAMA

STATE ADVISORY EXECUTIVE COMMITTEE

N. C. Glass, President.....Birmingham
F. F. Perry, Secretary-Treasurer..Montgomery

"Demonstrating Removable Bridge-Plate Attachments that Compensate for Tissue Movement."
By C. W. Lokey.....Birmingham

"Prophylactic Instruction to Patient in Treatment of Pyorrhea (Periodontoclasia)."
By H. Clay Hassell.....Tuscaloosa

"Porcelain Jacket Bridgework, with Some Practical Applications of All-Porcelain Bridges."
By L. Z. McClung.....Birmingham

"Surgical Removal of Teeth, and Preparation of Mouths for Dentures."
By James A. Blue.....Birmingham

ARKANSAS

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Elbert Stewart, First Vice President.....Little Rock
T. J. Newman, Second Vice President.....Little Rock
H. J. Crume, Secretary-Treasurer..El Dorado

"A Standardized Casting Technic Using the Same Principles from the Inlay to the Gold Plate"
By F. G. White.....Ft. Smith

"Helpful Hints in Inlay Construction"
By J. W. Deaton.....Texarkana

"Fixed Bridgework and Some Reasons Why I Employ It"
By E. H. Johnson.....Pine Bluff

CALIFORNIA

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John D. Millikin, President.....San Francisco
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Edward J. Howard, Second Vice President.....San Francisco
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"Partial Dentures and Removable Bridgework" (Demonstrating construction technic using Chayes' attachments)
By James Allen Graham...San Francisco

"Correcting Inharmonies of the Natural Teeth that Are Responsible for Periodontic Conditions"
By Frank C. Pague.....San Francisco

"Pyorrhea and Odontoclasia" (Photographic exhibit)
By F. V. Simonton.....San Francisco

"Physiologic Brushing"
By T. Sydney Smith.....San Francisco

"Porcelain Jacket Crowns" (Demonstrating a standard technic)
By Hugh Avary.....San Francisco

"Children's Dentistry"
By Charles A. Sweet.....Oakland

"Examinations of the Mouth Before Full Denture Construction, Using the Roentgen Ray and Study Casts"
By Frank H. McKevitt...San Francisco

COLORADO

STATE ADVISORY EXECUTIVE COMMITTEE

Max Giesicke, President ..... Denver
Mallory Catlett, First Vice President Denver
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William H. Flint, Secretary-Treasurer ..... Littleton

"Tuberculous Infection Through Gingival Lesions"
By C. S. Kramer ..... Woodmen

"Factors in Diagnosis"
By M. R. Howard ..... Denver

CONNECTICUT

STATE ADVISORY EXECUTIVE COMMITTEE

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E. R. Bryant, First Vice President New Haven
G. S. B. Leonard, Second Vice President ..... Mystic
S. E. Armstrong, Secretary-Treasurer ..... New Haven

"Orthodontia"
By F. T. Murlless, Jr. ..... Hartford

"(*a*) Practicable Methods of Wiring for Fractures. (*b*) A New Line of Exolevers and Modified Elevators. (*c*) Report of New Local Anesthetic, Tutocain"
By B. A. Sears ..... Hartford

"Orthodontia"
By E. P. Anderson ..... Hartford

"Time Savers We All Want to Know"
By R. A. Chandler ..... New London

"Difficult Extractions in General Practice"
By William J. McLaughlin ..... Bridgeport

Group Clinic

"Technic Study of the Ribbon Arch Mechanism"
By Edward H. Angle Study Club, Eastern Group
R. H. W. Strang, Chairman ..... Bridgeport
F. A. Gough ..... Brooklyn, N. Y.
Edward L. Mitchell Indianapolis, Ind.
Samuel P. Cameron Philadelphia, Pa.
W. H. Pearson ..... Norfolk, Va.
Walter N. Dunlap ..... Orange, N. J.
Helen A. Gough ..... Brooklyn, N. Y.
Julius Minez ..... Newark, N. J.

"An Operating Help"
By E. F. Cory ..... New Haven

"Orthodontia"
By Leslie P. Abbe ..... Hartford

DELAWARE

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"Simple Methods of Reducing Fractures of the Maxillae"
By William C. Speakman ..... Wilmington

"Amalgam Restorations"
By Charles R. Jefferis, Jr. ..... Wilmington

FLORIDA

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Group Clinic

"Partial and Full Denture Castings"
By the Tampa Dental Arts Club
C. J. Caraballo
C. L. Nance
A. M. Smith
W. G. Mason
W. A. Dean
C. C. Evans
J. D. Odeneal
R. C. Wilson

Group Clinic

"Fixed Bridgework Abutments on Vital Teeth"
By the Dental Surgeons Study Club of Jacksonville
L. W. Knight
R. P. Taylor
H. B. Pattishall
John A. Heard
C. J. Masters
A. W. Sears
W. G. Sherman
John I. Todd
J. R. Lynn

GEORGIA

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N. G. Slaughter, Treasurer ..... Athens

Group Clinics

"Root Canal Work"
By the Atlanta Root Canal Clinic Club
(*a*) "Diffusion," by C. W. Young
(*b*) "Opening," by J. H. Lorenz
(*c*) "Filling," by M. D. Huff
(*d*) "Electrolytic Medication" by K. R. Armstrong
(*e*) "Results," by Harry B. Johnston

Washington Monument

"Fixed Bridgework; Vital Teeth Abutments; Porcelain-Tipped Pontics"
By J. Russell Mitchell ..... Atlanta

"Porcelain Jacket Crowns and Porcelain Bridgework"
By J. G. Williams ..... Atlanta

"Retaining Appliances and Their Applications"
By H. Harvey Payne ..... Atlanta

"Partial Denture Construction"
By Claude N. Hughes ..... Atlanta

ILLINOIS

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J. P. Luthringer, Second Vice President ..... Peoria
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T. A. Broadbent, Treasurer ..... Chicago

"Cavity Cutting with Carborundum Stones"
By Arthur G. Smith ..... Peoria

"Cast Gold Inlays—A Standardized Method"
By Albert P. Grunn ..... Chicago

"Porcelain Jacket Crowns"
By Harold W. Oppice ..... Chicago

"Applied Anatomy for Conductive Anesthesia"
By Ralph H. Fouser ..... Chicago

"Fixed Bridge Attachments"
By Frank G. Conklin ..... Chicago
W. D. N. Moore ..... Chicago

"Partial Dentures"
By Polk E. Akers ..... Chicago

"Conservation of Tooth Tissue and Time in Gold Inlay Work and Esthetic Bridge Attachments"
By P. A. Pyper ..... Pontiac

"Full Dentures"
By E. Byron Kelly ..... Chicago

"Orthodontia"
By James W. Ford ..... Chicago

"Manipulation and Behavior of Amalgams"
By William E. Harper ..... Chicago

"Prolonged Retention of Deciduous Molars as a Causative Factor in Malocclusion"
By Charles R. Baker ..... Evanston

"One Piece Cast Removable Bridges and Partial Dentures; Showing Impressions, Models, Waxings, Mountings and Finished Cases"
By Frank E. Roe ..... Streator

"Uses of Wax-Amalgam"
By Harold O. Hansen ..... Chicago

"Pulp Canal Therapy"
By John H. Hospers ..... Chicago

"Better Dentures and How to Make Them"
By G. H. Henderson ..... Chicago

"Radiograms of Gross Pathologic Conditions of the Mouth and Jaws"
By Donald M. Gallie, Jr. ..... Chicago

"Fixed Bridgework; One Piece Castings and Cast Gold Crowns"
By Dana L. Woodworth ..... Chicago

"Block Anesthesia Technic"
By Howard C. Miller ..... Chicago

"The Treatment of Maxillary and Mandibular Fractures"
By Clyde S. Suddarth ..... Chicago

"Cast Gold Inlays"
By I. A. Smothers ..... Evanston

"Root Canal Fillings"
By E. D. Coolidge ..... Chicago

"Removable Bridges; One Piece Castings"
By F. Van Minden ..... Chicago

"Orthodontia"
By B. O. Sippy ..... Chicago

"Gold Inlays with Porcelain Veneer"
By D. H. Baldwin ..... Peoria

"Cast Gold Inlays, Using Low Heat Technic"
By Frank H. Vorhees ..... Chicago

"Modern Pulp Canal Treatment"
By Emmons S. Coe ..... Evanston

"Ceramics, Inlay, Crown and Bridgework, Partial and Full Dentures" (Specimens and Charts: a clinical exhibit from the Department of Prothesis, Northwestern University)
By R. O. Schlosser, J. J. Guerrero and R. H. Snyder ..... Chicago

INDIANA

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Frank A. Hamilton, President ..... Indianapolis
C. R. Jackson, First Vice President ..... Indianapolis
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"Full Dentures"
By Robert R. Gillis ..... Hammond

"Partial Dentures and Removable Bridgework, One Piece Castings, Employing Akers Technic"
By Perry L. Rigg ..... Lowell

"Full Denture Prosthesis"
By Walter E. Beyers ..... Indianapolis

"Crown and Bridgework"
By the Crown and Bridgework Section of the Indianapolis Dental Society Clinic Study Club
(*a*) Anatomic reproductions of natural teeth in plaster, by Ermal C. Baker, Christian Olsen, Edward R. Danforth, and Frank A. Hamilton
(*b*) Full cast gold crown technic, by Ert J. Rogers, James B. Carr and William I. McCullough

"Full Denture Prosthesis, Using Gold Base for Upper Denture, Employing Wadsworth Technic"
By Robert H. Hopkins ..... Indianapolis

"An Interesting Study of Osteomyelitis"
By Glenn J. Pell ..... Indianapolis

"Full Denture Technic, Demonstrating a New Theory of the Center of Rotation of the Mandible"
By Chester C. Miller ..... Indianapolis

Iowa

STATE ADVISORY EXECUTIVE COMMITTEE

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F. H. Waters, Treasurer ..... Ames

"Cavity Preparations for Gold Inlays"
By J. V. Conzett ..... Dubuque

"A Method of Boxing an Impression and Making a Cast"
By C. R. Baker ..... Davenport

"Cavity Preparations and Manipulation of Gold Foil" (with an exhibit of instruments)
By C. E. Woodbury and members of the Woodbury Study Club Council Bluffs

"Technic for Making a Gold Shell Crown"
By C. M. Work ..... Ottumwa

"Cavity Preparation and Construction of Gold Inlay, Indirect Method"
By F. H. Waters ..... Ames

"Some Abutments for Fixed Bridges"
By John W. Marsh ..... Keokuk

"Cavity Preparations for Abutments for Bridges, with Technic"
By H. J. Altfillisch ..... Dubuque

"Mandibular Movements"
By H. F. McGrane ..... Sioux City

"Suggestions for Home Care of the Mouth"
By H. D. Coy ..... Hamburg

"Immunizing Mouth Tissues, Both Hard and Soft, to Infection, by Correct Stimulation with Toothbrush"
By W. J. Charters ..... Des Moines

"Some Technical Procedures in the Preparation of Proximal Cavities"
By John Scholten ..... Cedar Rapids

"Anterior Bridge with Baked Porcelain Tips for a Case Not of Recent Extraction"
By Lester L. DeYarman ..... Cedar Rapids

Kansas

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"Simple Type of Abutment for Lower Anterior Bridge"
By John E. Morgan ..... Emporia

"Individual Removable Bridge Attachment"
By E. E. Welch ..... Topeka

"Exodontia"
By C. N. Mertz ..... Topeka

"Porcelain Pontics"
By C. S. Kile ..... Hutchinson

"Inlay Casting"
By E. E. Ramsey ..... Topeka

"Building and Repairing of Vulcanite Dentures Without the Use of Wax"
By S. S. Noble ..... Witchita

Kentucky

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William E. Goepper, Secretary-Treasurer ..... Louisville

"Modeling Compound Technic of Taking a Negative Pressure Impression"
By I. V. Duell ..... Louisville

"Mixing and Inserting Synthetic Porcelain"
By A. F. Ellington ..... Bloomfield

"Inlay Casting"
By Garnett H. Smith ..... Louisville

"Carmichael Crowns on Single Teeth, and for Bridge Abutments"
By P. E. Sloan ..... Whitesburg

"Porcelain Jacket Crowns"
By J. B. Hutcherson.....Louisville

"Proper Instrumentation in the Treatment of Periodontoclasia"
By George H. Heymann.....Louisville

"A Practical Illustration of Unequal Shrinkage as It Relates to Compound Gold Castings, and a Method to Equalize Shrinkage as It Relates to Three-Quarter Molar Crowns"
By L. C. Burgard.....Louisville

"The Ford Method of Correcting Malocclusion"
By Joseph W. Ford.....Bowling Green

LOUISIANA

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"A Consideration of the Essentials of Avoiding Trauma to Clasped Teeth in Partial Appliances, Including a Form of Handmade Joint"
By S. H. MacAfee.....New Orleans

"An Unusual Case of Impacted Lower Cuspid. Extensive Case of Protrusion of the Upper and Lower Alveolar Process Before and After Operation"
By J. P. Wahl.....New Orleans

"Impression for Partial Dentures"
By Sidney L. Tiblier and D. F. Ballina.....New Orleans

MAINE

CLINIC COMMITTEE

D. M. Small, President.....Kennebunk
W. F. Fogg, Secretary.....Waterville
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Henry A. Kelley, Chairman.....Portland

"(A) Hand Carved Porcelain as Applied to Modern Jacket Crown and Bridgework"
"(B) Cavity Preparation and Inlays, Both Single and Abutment, for Bridgework"
By George J. Anderson.....Portland

MARYLAND

STATE ADVISORY EXECUTIVE COMMITTEE

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A. H. Paterson, Second Vice President.....Baltimore
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H. A. Wilson, Treasurer.....Baltimore

"Orthodontic Device for the Application of More Positive Intermaxillary Force. A Method of Utilizing Only the Natural Functional Forces of Mastication to Accomplish Mesiodistal Movements of the Teeth, and Development of the Jaws"
By Norris C. Leonard.....Baltimore

"Crown and Bridge Restoration"
By Francis J. Ellison.....Baltimore

"Preparation and Restoration in Full Denture Construction"
By G. W. Gaver and Horace M. Davis.....Baltimore

"Porcelain Jacket Crowns and All Porcelain Bridges"
By George S. Koshi.....Baltimore

"Impression Taking"
By Thomas H. Litz.....Baltimore

"Some Fundamental Precautions Preliminary to the Application of Bridgework"
By James H. Ferguson, Jr.....Baltimore

MASSACHUSETTS

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Oral Surgery

"Temporary Splints for Immediate Use in Fracture Cases"
By W. H. Richardson.....Worcester

"Some Helpful Hints in the Practice of Exodontia"
By F. E. Jeffery.....Salem

Orthodontia

"The Practical Application of Labial Extensions from the Lingual Arch"
By George Cowles Brown.....Worcester

"Jackson Removable Orthodontia Appliances"
By William H. Gilpatric.....Boston

"Orthodontia Cases Under Treatment, Showing Progress with Appliances in Place"
By Herbert I. Margolis.....Boston

"Roentgen-Ray"
By Frederick E. Rice.....Salem

"Partial Dentures with Record Models"
By A. F. Townsend.....Worcester

Michigan

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"Preliminary Full Denture Problems"
By A. Alfred Nelson.....Detroit

"Another Idea for a Three-Quarter Crown"
By James C. Shanks.....Detroit

Group Clinic

"Occlusion and Its Biologic Significance"
By Samuel J. Lewis and Associates.....and S. A. MacKenzie.....Detroit

"Problems Associated with the Loss of Deciduous Teeth, and Construction of Space Retainers in These Cases"
By Frank S. Cartwright.....Detroit
F. R. Harding.....South Lyon

"The Radiogram in Orthodontic Practice"
By Breyton D. Jones.....Detroit

"Accurate Impression Taking and Model Making"
By S. J. Lewis.....Detroit

Minnesota

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"Some Case Histories Indicative of the Relation of Impacted and Imbedded Teeth to Systemic Disturbances"
By J. A. Heidbrink.....Minneapolis

"Common Methods of Orthodontic Procedure and Results Obtained"
By B. G. de Vries.....Minneapolis
Max E. P. Ernst.....St. Paul

"Fixed Bridgework"
By E. T. Tinker.....Minneapolis

"Full Denture Construction, Wadsworth Technic"
By Leon D. Leslie.....Minneapolis

"Preparations on Vital Teeth as Bridge Abutments, Including Chayes Movable-Removable Bridgework"
By Julius A. Peterson.....Duluth

"Control of Variables in the Casting Process"
By H. A. Maves.....Minneapolis

"Technic Employed in the Removal of First Molars"
By Boyd S. Gardner.....Rochester

"Restoration to Occlusal Balance by Means of Fixed Bridges"
By C. K. Bird.....St. Paul

"The Spherical Principle of Occlusion as Applied to Partial Dentures"
By O. DeForest Davis.....Minneapolis

"The Porcelain Inlay; Models of Preparations; Technic of Building and Completing"
By Raymond R. Henry.....Minneapolis

"The Porcelain Veneer Crown; Models of Preparations; Technic of Building and Completing"
By L. C. McCarthy.....St. Paul

"The Color Problems in Porcelain Restorations; Technic of Interpreting Proper Color in the Inlay and Crown"
By W. D. Vehe.....Minneapolis

"Recent Research in Bone Changes and Development"
By George S. Monson.....St. Paul

"An Explanation of Some of the Misunderstandings Concerning the Monson Instrument and Technic"
By H. B. Washburn.....St. Paul

Mississippi

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"Phases of Orthodontia of Interest to the Dental Practitioner"
By B. B. Kennedy ..... Jackson

"Surgical Extraction and Granulomectomy Using Open-View Technic"
By Rush P. Abbott ..... West Point

Group Clinic

"Bridgework Showing Different Types of Attachments with Porcelain Pontics"
By R. S. Neyland ..... Jackson
J. H. Brown ..... Newton
G. F. Haynes ..... Laurel

"Attachment of Porcelain Pontics"
By H. D. Chipps ..... Corinth

MISSOURI

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J. P. Harper, Treasurer ..... St. Louis

"Swaged-Cast Abutments for Fixed Bridgework on Vital or Nonvital Teeth"
By Edouard M. Hall ..... Kansas City

"Occlusion"
By Dayton Dunbar Campbell ..... Kansas City

"Fixed Bridgework"
By the Kansas City Crown and Bridge Group Clinic
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C. E. Burgson
F. E. Byers
P. F. Gilbreath
L. N. Glaze
R. M. Seibel
J. C. Warnock
E. H. Westenhaver

"Fixed Bridgework" (Showing upper with attachments and pontics)
By George B. Scott ..... St. Louis

"New Porcelain Dummy Which Does Not Come in Contact with the Gum Tissue, and Is Interchangeable"
By E. E. Haverstick ..... St. Louis

"Partial Porcelain Veneers"
By Willis A. Coston ..... Kansas City

"The Esthetic Effect Obtained by the Arrangement of the Six Anterior Teeth"
By E. B. Owen ..... St. Louis

"Dental Ceramics"
By Edgar H. Keys ..... St. Louis

"Reinforced Silicate Angle Restorations"
By R. C. Seibert ..... St. Louis

MONTANA

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A. H. Cole, Second Vice President ..... Butte
J. E. Buehler, Secretary ..... Great Falls

"Technic of a Combination of the Cast Clasp and Inlay as an Abutment for Fixed Bridgework"
By Patrick Jerome Sweeney ..... Red Lodge

NEBRASKA

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W. L. Shearer, Second Vice President ..... Omaha
H. E. King, Secretary-Treasurer ..... Omaha

"Dental Physiology"
By J. M. Prime, E. H. Bruening and H. E. King ..... Omaha

"Inlay Attachments in Bridgework"
By F. W. Webster, R. W. Ludwick and C. A. Bumstead ..... Lincoln

"The Indirect Method of Construction of Inlays and Bridge Attachments"
By Ferdinand E. Griess ..... Sutton

"A Study of Erosion"
By M. E. Vance ..... Lincoln

"Cement Models for Indirect Inlay Work"
By Guy L. Spencer ..... Lincoln

NEW HAMPSHIRE

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Otis M. Littlefield, President ..... Manchester
W. J. Moyles, Secretary ..... Manchester
W. A. Young, Treasurer ..... Concord

"Crowns and Other Adjuncts"
By A. J. Sawyer ..... Manchester

Officers of the Section on Military Surgery, Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

New Jersey

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William H. Gelston, President ..... Camden
John C. Forsyth, First Vice President ..... Trenton
George H. Grim, Second Vice President ..... Jersey City
F. K. Heazelton, Secretary ..... Trenton
A. E. Boice, Treasurer ..... Trenton

"Visual Relations for Some Failures in the Correction of Class II or Disto-Occlusal Cases"
By Charles A. Spahn ..... Newark

"Full Upper and Lower Dental Construction"
By A. A. Harrington ..... Newark

"Shoulderless Porcelain Jacket Crowns"
By J. William Sherer ..... East Orange

"Amalgam Restorations; an Improved Technic for the Alloy Filling"
By Horace I. Beemer ..... Newton

"Root Canal Technic"
By Milton J. Waas ..... Camden

"Rechecking Finished Dentures for Error"
By L. Thomas Asche ..... Newark

"Principles of Periodontia Applied. The Successful Prevention and Treatment of Periodontoclasia"
By Israel S. Miller ..... Jersey City

New Mexico

STATE ADVISORY EXECUTIVE COMMITTEE

J. J. Clarke, President ..... Artesia
D. R. Biddle, Vice President ..... Albuquerque
H. S. Murdock, Secretary-Treasurer ..... Springer

"Gold Inlays and Impressions, Indirect Method"
By J. J. Clarke ..... Artesia

New York

STATE ADVISORY EXECUTIVE COMMITTEE

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A. M. Wright, Second Vice President ..... Troy
M. J. Terry, Secretary ..... Albany
G. B. Beach, Treasurer ..... Syracuse
F. R. Adams, Chairman of Clinic Committee ..... New York

"A Method of Taking Partial Impressions with Compound Without Tray"
By Ellison Hillyer ..... Brooklyn

"Pinledge Attachment for Vital Anterior Teeth"
By James K. Burgess ..... New York

"Treatment of Occlusal Surfaces for the Prevention of Caries"
By Thaddeus P. Hyatt ..... New York

"When to Curet and When Not to Curet"
By Morton Van Loan ..... Albany

"A Simple and Definite Technic with Cement for the Substitution of Missing Dentin in Deep Seated Cavities; Elimination of Undercuts and Ideal Form"
By Rudolph H. Reese ..... Brooklyn

"Producing Natural Tooth Characteristics in Stock Porcelain Teeth"
By Alfred Walker ..... New York

"Round Wire Clasps for Partial Dentures and Removable Bridges"
By Henry W. Gillett ..... New York

"Fixed Bridgework"
By Edgar S. Gill ..... Utica

"The Menace of Some Tooth Cleaning Liquids"
By William H. Nitzschke ..... Utica

"Cavity Preparation for Porcelain Inlays"
By William J. Meier ..... New York

"Bridgework Restoration in Conformity with the Physiologic Demand of the Human Denture"
By Herman E. S. Chayes ..... New York

"Root Canal Technic"
By M. L. Rhein and E. Alan Lieban ..... New York

"Gold Inlays; Indirect Method"
By William D. Tracy ..... New York

"Precision Attachments for Fixed Bridgework"
By Simon Shapiro ..... Brooklyn

"Some Uses of Porcelain in Dental Restorations"
By Guy M. Fiero ..... Buffalo

"Cast Gold Inlays and Three-Quarter Crowns"
By Joseph L. Cleveland ..... Buffalo

"Clasp Retention"
By Walter F. Chappelle ..... Buffalo

"Prophylaxis for Children"
By John L. Garretson ..... Buffalo

"Alveolectomy"
By Griffith G. Pritchard.....Buffalo

"Wax Manipulation and Investing in Casting"
By E. C. Thompson.....Buffalo

"Light Therapy"
By M. D. Wolfsohn.....Buffalo

"A Method for Rebasing Full Dentures"
By L. L. Mulcahy.....Batavia

"Problems in Full Dental Construction"
By the Buffalo Study Club of Dental Engineering
E. J. Farmer
H. E. Reynolds
E. B. Darling
B. G. Wakefield

"Casting Inlays by Radio"
By the Round Table Study Club of Buffalo
Edgar J. Doolittle
Paul W. Zillman
Leon J. Gauchat
Edward R. Melcher

"Progressive Clinic on the Treatment of Periodontoclasia"
By the Periodontia Clinic Club of New York
(*a*) "Diagnosis and Case Records," by John Oppie McCall
(*b*) "Traumatic Occlusion," by Paul R. Stillman
(*c*) "Apoxesis (Root Surgery)," by Arthur H. Merritt
(*d*) "Prophylactic Treatment," by Leroy S. Edwards (Brooklyn)

"Differential Diagnosis of Periodontal Disease"
By I. Hirschfeld.....New York

"Completed Porcelain Restorations; Continuous Gum; Jackets; Usefulness of the Porcelain Jacket Crown in Removable Bridgework"
By Ceramic Clinic Club of New York City (Group 1)
William A. Squires
Milton Cohen
Carlisle C. Bastian

"Jacket Restorations in Various Steps; Preparations for Jacket, Packing, and Making of Dies; Completed Jackets, and Staining of Teeth"
By the Ceramic Clinic Club of New York City (Group 2)
William J. Hoag
Charles B. Mandelbaum
Oscar J. Chase, Jr.

"Tooth Reproduction or Carving Clinic"
By M. Diamond.....New York

Group Clinic

"Full Denture Technic"
By New York Prosthetic Club (Group 1)
(*a*) "Impressions for Full Dentures," L. W. Doxtater
(*b*) "Establishing Centric and Vertical Mandibulomaxillary Relations; Facebow Transfer, and Attachment of Casts to Articulator," by C. M. McNeely
(*c*) "Use of an Articulator to Harmonize Tooth Occlusions with Jaw Relations," by Victor H. Sears
(*d*) "Investing, Packing, Vulcanizing and Finishing of Vulcanite Dentures," by Martin L. Collins

Group Clinic

"Impressions for Full Dentures"
By New York Prosthetic Club (Group 2)
(*a*) "Sectional Compound Impressions and Rebasing Technic for Partial Dentures," by Edward Kennedy
(*b*) "Influence of Facial Contour on Arrangement of Teeth in Artificial Dentures," by James P. Ruyl
(*c*) "Swaged Metal Bases for Full Dentures," by Russell W. Tench

"Special Technic in Block Anesthesia, Particularly Applicable to Oral Surgery"
By Clifford E. Rose.....Buffalo

North Carolina

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"Alexander Method and Technic of Making Artificial Dentures"
By C. L. Alexander.....Charlotte

"Alexander Interdental Splint"
By J. W. Stanley ..... Wilmington

"Porcelain Pontic Bridges with Special Reference to Cast Attachments for Vital Teeth"
By J. A. McClung ..... Winston-Salem

"Technic for Establishing Correct Occlusal Planes in Crown and Bridgework"
By E. B. Howle ..... Raleigh

"Full Denture Prosthesis"
By L. G. Coble ..... Greensboro
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"Hall Method of Full Denture Construction; Taking and Boxing Impressions; Flowing Cast; Taking and Building Bite Establishing Condyle Paths"
By J. W. Whitehead ..... Smithfield

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"Tooth Form and Function from Carvings in Plaster"
By H. C. Cooper ..... Abercrombie

"Difficulties Confronted in Aiming at Accuracy in Casting Process"
By F. J. Hartl ..... Minot

"Preparation and Insertion of Gold Foil"
By C. A. Putney ..... Fargo

"Manipulation and Packing of Amalgam"
By J. T. Layne ..... Fargo

Ohio

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"Diagnosis and Treatment of Vincent's Infections"
By Edward L. Ball ..... Cincinnati

"Efficiency in Root Canal Technic"
By Rudolph Siegal ..... Cincinnati

"Device for the Preparation of Parallel Walls in Cavities and Teeth for Abutments"
By D. J. Lloyd ..... Portsmouth

"Education in Dental Health for the Patient"
By Gillette Hayden ..... Columbus

"Management of Cases in Which Teeth Are Converging"
By Alden J. Bush ..... Columbus

Independence Hall, where the Declaration of Independence was signed, July 4, 1776.

"Porcelain Jacket Crowns"
By Chester R. Marshall ..... Columbus

"Chayes Removable Restorations" (Duplicates of practical cases; detail of saddle planning; enlarged photographs at different stages of construction)
By S. M. Weaver and Herman Wald (technician) ..... Cleveland

"A Unique and Rapid Method of Accurately Forming an Indirect-Direct Wax Pattern for Inlays and Cast Crowns"
By H. D. Grubb ..... Cleveland

"Various Applications of Porcelain in Dental Practice"
By J. M. Oelschlager.....Cleveland

"Demonstration of Ultraviolet and Polarized Light Phenomena and Their Relation to Calcium Metabolism"
By Weston A. Price.....Cleveland

Group Clinic

The Crown and Bridge Section of the Toledo Study Club

L. L. Barber, Director

"Cavity Preparation," by W. J. Dierks and L. E. Phelps

"Impression and Bite," by W. S. Graves and J. J. Welker

"Investing, Impression and Packing Amalgam," by J. W. Travis

"Articulating Model and Wax Pattern," by R. H. Vollmayer and J. W. Hartshorn

"Investing Wax Pattern; Eliminating Wax; Casting and Cleaning Inlay," by Walter H. Hisey and R. K. Wood

"Fitting and Polishing; Cementing and Finishing; Temporary Filling," by L. L. Barber

"Fixed Bridgework," by the Crown and Bridge Work Section of the Callahan Study Club, Cincinnati
M. C. Schuman, Director.

OKLAHOMA

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"Impression of Edentulous Mouths with Heavy Submucuous Tissue"
By J. B. Herring.....Oklahoma City

"Recording Central Occlusion and Occlusal Plane in Patient's Mouth to Establish Correct Ridge Relation in Full Dentures, and Transferring to Articulator"
By W. T. Jacobs.....Muskogee

"Diet; Three Perfectly Balanced Meals"
By A. L. Walters.....Tulsa

"A Method of Using the Natural Teeth in Bridge Construction"
By A. E. Bonnell.....Muskogee

"Immediate Denture Service"
By Roy H. Ellis.....Okmulgee

OREGON

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"Inlay Technic for Bridgework"
By Carl E. Miller.....Salem

"Orthodontia"
By Charles H. Walrath.....Portland

"Oral Diagnosis"
By Henry Cline Fixott.....Portland

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"Standardized Sectional Technic for Supplying Partial Restorations of All Gold and Porcelain"
By Albert S. Mulford.....Philadelphia

"Complete Step Clinic of the Improved Wadsworth Technic for Full Denture Construction"
By Edward B. Dewhurst.....Philadelphia

"Cysts and Odontomas of Dental Origin (Radiographic Interpretation)"
By John H. Gunter and Le Roy M. Ennis.....Philadelphia

"The Use of the Labial Auxiliary Spring in Orthodontic Treatment"
By Andrew F. Jackson.....Philadelphia

"Porcelain Jacket Crowns, Direct and Indirect Methods"
By W. W. Powell.....Philadelphia

"Employment of Porcelain Jacket Crowns as an Attachment in Stationary and Removable Restorations, Robinson's Technic"
By J. C. Entriken ..... Philadelphia

"Use and Application of Ultraviolet Ray in Dentistry"
By John H. Greene ..... Philadelphia

"Modern Technic in Construction of Pin Inlays, Onlays and Other Types of Abutment Attachments Considering Conservation of Tooth Structure"
By Edward A. Manning ..... Chester

"Porcelain Jacket Crowns for Eroded Vital Teeth Under Clasp Bridges"
By D. S. Gardner ..... Scranton

"Porcelain Inlays"
By John Burkhardt, Jr. ..... Philadelphia

"Conservation of the Pulp; Use of Germicides in Deep Seated Cavities; Root Canal Work"
By Andrew J. Seeler ..... Philadelphia

"Practical Application of Porcelain"
By W. H. Fordham ..... Scranton

"Advantages and Disadvantages of Silver Reduction Method in Operative Work"
By W. W. Booth ..... Pittsburgh

"Showing the Internal Anatomy of the Tooth"
By George C. Roll ..... Pittsburgh

"Indirect Gold Inlay Technic"
By C. S. Harris ..... Pittsburgh

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"Full Denture Prosthesis Employing Condylar Adjustment"
By W. H. Wright, R. A. Gougler, R. I. Crumpton, E. H. Moore and H. W. Bradley ..... Pittsburgh

"Recording of Forces Exerted by Auxiliary Springs in Orthodontia"
By H. C. Metz and R. E. Irish ..... Pittsburgh

"Cavity Preparation for Gold Foil Fillings"
By William Finn ..... Pittsburgh

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"Progressive Malocclusions" (Illustrated by 100 models)
By I. B. Stilson ..... Providence

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"Salient Points of Difference in the Practice of Children's Dentistry"
By Minnie M. S. Proctor ..... Los Angeles

"Continuous Gum Dentures Featuring Pinless Teeth and the Control of Shrinkage by Swaging"
By P. C. Tennis and James L. Howard ..... Los Angeles

"Porcelain Jacket Crowns and Inlays"
By Charles O. McBean ..... Los Angeles

"Porcelain Jacket Crown Technic, Showing Each Step in Detail"
By Nye White Goodman ..... Los Angeles

"Root Canal Technic"
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"Practical Points in Correlating Preaching and Practice"
By Walter T. McFall ..... Greenville

"Restorations with Amalgam"
By V. R. Hawkins ..... Union

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"Capping of Aching and Painful Pulps by a New Process"
By Raymond W. Ellis—Salem

"Rebasing Full Upper and Lower Dentures by J. B. Nelson Method Without Distorting the Articulation or Proper Relation of the Plate"
By J. B. Nelson—Avon

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"Opening and Treating the Root Canal"
By Harry M. Underwood—Knoxville
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"Inlays and Bridge Abutments"
By Roy C. Elam—Nashville

"Bowen Technic for Stabilizing Lower Plate"
By Bowen K. Bowen—Nashville

"Dissipation of Wax Pattern by New Process and Its Advantages in Inlay and Other Castings"
By W. H. Richards—Knoxville

"Clinic Showing Evolution in Articulators and Demonstrating the Efficiency of the Gysi Articulator"
By Johnson G. McDowell—Nashville

"Porcelain Inlays and Porcelain Jacket Crowns"
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By P. G. Spencer—Waco
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Group 2

"Full Denture and Prosthetic Restoration"
By J. M. McMinn—Dallas
B. F. Thielen—Paris
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W. A. Grouws—Dallas
A. Frank Walters—Dallas

"Porcelain Jacket Clinic Group"
By E. L. Williams and W. T. Newton—Houston

"Callahan's Modified Root Canal Filling"
By Sam H. Brock—Dallas

"Mottled and Brown Stained Teeth"
By C. D. Wofford—Plainview

"Fixed Bridgework"
By F. E. Thornburgh—Wichita Falls

"An Original Idea in Stress Breakers"
By W. T. Stewart—Waco

"Cast Gold Jacket Crown with Ground Porcelain Front"
By Roy V. Woolwine—Ft. Worth

"Model Treatment for Smooth Finish Vulcanite"
By Field Farrar—Ft. Worth

"A Modified Three-Quarter Crown; Replaceable Porcelain Tip Dummies"
By J. O. Hall—Waco

"Texas Dental College School Clinic"
By O. F. Gambati—Houston

Utah

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"Radiographic Technic"
By E. W. Browning—Salt Lake City

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Group Clinics

Group 1

"Practical Porcelain Restorations"
By R. H. Jefferies, R. I. Pusey and John C. Tyree ..... Richmond

"Bilateral Resection of the Mandible for Orthodontic Correction of Class III Case"
By W. H. Pearson ..... Norfolk

Group 2

Cast Partial Dentures by an Indirect Method

"Section Impression Technic" (Each step shown on casts)
By Thomas W. Wood ..... Richmond

"Preparation of the Impression; Cast Making; Plaster Bite Technic"
By R. H. Bruni ..... Richmond

"Designing and Construction, Showing Denture Waxed and Method of Removing It from the Cast, Castings Made, Assembled, Etc."
By C. C. Vaughan ..... Richmond

"Finished Cases; also Types of Stress-Breakers Applicable to the Various Types of Cast Partial Dentures, Which Include Posterior, Anterior, Split Saddle and Split Clasp Stress-Breakers"
By M. B. Rudd ..... Richmond

"Evolution of Prosthetic Attachments"
By S. D. Kent ..... Danville

"Full Denture Construction"
By W. R. Dodd ..... Richmond

WEST VIRGINIA

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"Removable Restorations"
By A. E. Hennen ..... Wheeling

"Amalgam Technic"
By L. A. Stark ..... Shinnston

"Perfectly Adapted Posterior Shell Crowns"
By C. H. Neill ..... Fairmont

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Group Clinics

Group 1

"Helpful Suggestions in the Obtaining of Impressions for Inlay and Three-Quarter Crown Cast Work"
By L. F. O'Connor ..... Green Bay

"Manipulation and Demonstration of Soft Gold Foil Filling"
By L. H. Moore ..... Appleton

"Amalgamation, Placing and Condensing Filling Material"
By T. J. Seiler ..... Neenah

"Proper Steps in Root Canal Technic and Filling"
By Joseph V. Miller ..... Manitowoc

"Prophylactic Treatment and a Consideration of Periodontia in Pyorrhea"
By M. L. Christensen ..... Oshkosh

"Movable Fixed Bridgework"
By G. A. Stratton ..... Oshkosh

"Selection of Medicinal Remedies and Their Application in the Preparation of Teeth for the Reception of Root Canal Filling, and Other Oral Diseases"
By W. E. Tennant ..... Fond du Lac

Group 2

"Comparative Resistance of Different Types of Attachments for Bridges and Partial Dentures" (Demonstration with models)
By Samuel H. Chase and D. P. Wheeler ..... Madison

"Method of Obtaining a Proper Adaptation of Artificial Dentures"
By Eugene H. Gatterdam ..... La Crosse

"Fixed, Movable-Fixed and Movable-Removable Bridges"
By J. C. Mortonson and M. H. Mortonson ..... Milwaukee

"Importance of Occlusal Balance in Dental Reconstruction with Models of Completed Cases, Showing Method of Arriving at a Proper Diagnosis"
By G. E. Cleophas ..... Beloit

Officers of the Section on History, Science and Library, Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

"Safe and Simple Surgical Technic for the Removal of a Large Third Molar Deeply Imbedded in an Upright Position, When the Occlusal Surface Is Beneath the Upper Border of the Mandible and the Apex Close to the Lower Border and Sacrifice of Bone May Result in a Fracture"
By T. A. Hardgrove.....Fond du Lac

"Practical and Simple Method of Porcelain Jacket Crown Construction"
By W. H. Cudworth.....Milwaukee

"Surgical Technic for Removal of Impacted Cuspid"
By Roy S. Hopkinson.....Milwaukee

"Resection of Gum Tissue and Curretment of Bone in the Treatment of Pyorrhea"
By E. J. Weaver.....Milwaukee

"Orthodontia"
By A. C. Rohde.....Milwaukee

"Orthodontic Methods of Calvin Case"
By Carl B. Case.....Milwaukee

"Cast Gold Inlay, Semi-Indirect Method"
By K. M. O. Solbrig.....Milwaukee

"Cast Partial Dentures"
By W. D. Gearen.....Racine

Wyoming

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"Space Retainer on Temporary Teeth"
By I. P. Hayes.....Sheridan

"Removable Porcelain Bridge"
By Peter Appel, Jr.....Cheyenne

DENTAL SCHOOL CLINICS

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"Operative Procedures"
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"Children's Dentistry"
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"Root Canal Therapy"
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"Pulp Canal Fillings"
By P. G. Puterbaugh

"Fixed Bridge Attachments for Teeth Containing Vital Pulps"
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"Orthodontia"
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"Full Denture Construction"
By Rupert E. Hall and Elbert C. Pendleton

"Removable Bridge Construction"
By William I. McNeil

UNIVERSITY OF ILLINOIS, COLLEGE OF DENTISTRY

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"Radiography; Photography; Its Value in Dental Colleges"
By Anna Reginalda Bolan

"Ceramics, Crown and Bridgework"
By Stanley D. Tylman

"Operative Dentistry; Gold Inlay Technic"
By V. T. Nylander

"Root-Canal Therapy"
By J. R. Blayney and E. C. Wach

"Denture Department"
By John Sanford Kellogg and Waclaw Howard Kubacki

THE STATE UNIVERSITY OF IOWA, COLLEGE OF DENTISTRY

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"Methods of Instruction in the Application and Construction of Porcelain Tip Pontics"
By Arthur O. Klaffenbach

"Methods of Teaching Dental Radiography"
By Ernest A. Rogers

"Methods of Instruction in Operative Procedures"
By Alvin W. Bryan

"Methods of Instruction in Prosthetics"
By Earle S. Smith

"Methods Used in Teaching Crown and Bridge and Porcelain Technics"
By Ray V. Smith
"Teaching Material on Fractures, Cysts and Osteomyelitis"
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"Oral Examination and Diagnosis"
By J. T. O'Rourke
"Methods of Teaching Operative Technics"
By R. P. Overstreet

HARVARD UNIVERSITY DENTAL SCHOOL
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"The Teaching of Modern Amalgam Technic"
By the Harvard Amalgam Club
Harold E. Tingley
Elbert S. Godfrey
Walter H. Irvine
Clarence G. Severy
Ralph M. Towle
"Partial Dentures"
By Arthur M. Maloney and assistant

TUFTS COLLEGE DENTAL SCHOOL
William Rice, Dean

"Problems of Occlusion in Partial Prosthesis, from a Teaching Standpoint" (Illustrated by articulated models)
By Walter G. Bridge
"The Teaching of Full Denture Prosthesis"
By William H. Hoyt and Earle S. Bucknam
"Dentistry for Children"
By Edward F. Sullivan
"The Teaching of Cavity Preparation and Gold Foil Filling"
By Curtis W. Farrington

THE UNIVERSITY OF MINNESOTA, COLLEGE OF DENTISTRY
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"Crown and Bridgework"
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THOMAS W. EVANS MUSEUM AND DENTAL INSTITUTE, THE UNIVERSITY OF PENNSYLVANIA SCHOOL OF DENTISTRY
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"Methods of Teaching Full Denture Prosthesis in the Clinic"
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"Anatomic Restorations"
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By James C. and Morton H. Mortonson
"Porcelain Jacket Crown Construction"
By Harvey M. Uebele
"General Information Concerning the Dental Curriculum at Marquette University"
By Robert G. Haukohl

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"Root Canal Work"
By Harry B. Johnston, Alfred Enloe and W. E. Coleman

"Crown and Bridgework and Technics"
By A. L. King

"Denture Work and Technics"
By M. H. Varn

"Operative Dentistry and Technics"
By J. Ross Tucker

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"Mechanical Reproduction of the Human Masticatory Apparatus"
By Alexander H. Paterson, G. W. Gaver, W. W. Boatman, G. W. Phillips, E. G. Gail, O. C. Hurst and G. C. Karn.

THE OHIO STATE UNIVERSITY, COLLEGE OF DENTISTRY

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"Prosthetic Technical Procedures as Performed by Students Preparatory to Their Practical Work in Plate Prosthesis"
By Harvey Van Doren Cottrel, Herbert S. Shumway, Webster M. Baker and Harvey C. Highman

"Operative Technical Procedures as Performed by Students Preparatory to Entering the Course in Practical Clinical Procedures"
By Charles W. Strosinder, H. C. Hebble, I. A. Bottenhorn and L. E. Reif

TEMPLE UNIVERSITY DENTAL SCHOOL

I. N. Bromell, Dean

"A Short Course in Metallurgic Laboratory, with Work of Student and Apparatus Required for Work Exhibited"
By H. H. Boom

"Applied Principles of Cavity Preparation; Methods of Teaching Tooth Morphology by Means of Drawings and Soap Carvings"
By F. S. Rusca

"Course in Elemental Essentials, Pertaining to Technic in Orthodontics and Crown and Bridgework, Progressively Arranged"
By C. Barton Addie

"The Art of Natural Tooth Imitation by Reforming Stock Porcelain and Producing Characteristic Stains"
By Norman S. Essig

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"Porcelain Jacket Crowns and Inlays, Removable Bridgework"
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By Frederick L. Stanton

U. S. NAVAL DENTAL SCHOOL

Group Clinic

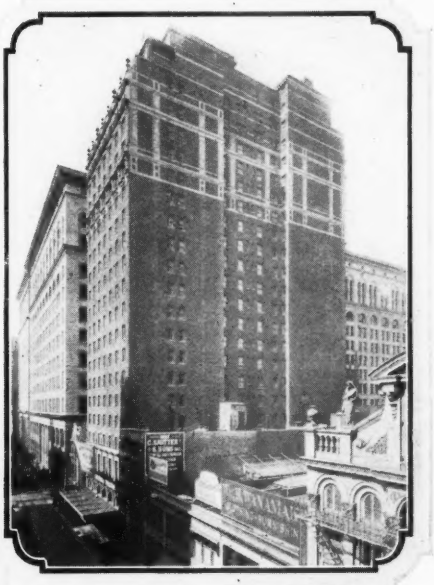
"Radiographic Technician. Interpretation Based on Angulation"
By W. L. Darnall

"Rebasing Technician"
By A. W. Chandler

"Fracture Appliances Used in the Navy"
By A. Knox

"Fixed Bridgework"
By Francis Ulen

"Amalgam Restoration"
By C. L. Thompkins



Philadelphia Hotels. Above: Bellevue-Stratford (headquarters for the Seventh International Dental Congress); Sylvania. Below: Ritz-Carlton; Adelphia.

THE PHILADELPHIA SESSION

A STATEMENT FROM THE COMMITTEE ON LOCAL ARRANGEMENTS

The committee to whom has been delegated the duty of making the arrangements of a local character for the Seventh International Dental Congress in Philadelphia, August 23-27 of this year, has been systematically at work for about a year and a half making preparations for this gathering. At this writing, these arrangements are as nearly complete as is possible at this date, and Philadelphia will be in full readiness to receive the host of visitors whom it hopes to welcome to the meetings of the Congress at that time. Preparations have been made to furnish suitable halls and meeting places for all the varied social and scientific activities of the Congress, to facilitate the securing of suitable living quarters for all members while here, and to provide for their entertainment while guests in our city.

The Commercial Museum, located on Thirty-Fourth Street near Spruce, will be the center of the Congress meetings. This spacious building, with a hall 300 by 400 feet (about two and three quarters acres in area) is sufficiently large to house nearly all of the various activities of the Congress. In it will be found the registration offices, rooms for the majority of the section meetings, the historical and scientific exhibit, the oral hygiene exhibit and the manufacturers' exhibit. Provision has been made for a large central foyer, suitably decorated and furnished with comfortable chairs, where guests may meet and enjoy social intercourse. A restaurant is also planned for the convenience of members. A fully equipped branch post office, to which all members, exhibitors and visitors are invited to have their mail directed; telegraph and telephone facilities; a bureau of information; a press room; an interpreter's bureau; medical and nursing service, and everything that may be required for the comfort and convenience of those in attendance have been provided.

Plans have been made for the installation of information booths manned by trained clerks, in the prominent hotels as well as in the Museum building. Interpreters wearing the national insignia of the various countries will be provided for visitors who do not speak English. The official tourist and travel agency will maintain a booth for complete travel information and tickets within the Museum building.

It will be highly advantageous to have all these activities within one building. A few of the sections will meet in the halls of the University of Pennsylvania, which adjoins the Commercial Museum, but none of these will be more than two city blocks distant.

The buildings in which the Congress will be held are about one mile from the center of the city and the official headquarters hotel, the Bellevue-Stratford, and are near excellent means of transportation, trolley or bus, from all quarters of the city.

It is believed that the social arrangements and entertainments will be a prominent feature of the Congress. Those to be included in the official program are herewith given:

PRELIMINARY PROGRAM OF EVENING ENTERTAINMENTS AND ARRANGEMENTS

MONDAY, AUGUST 23, 8 p. m.

Opening general meeting of the Congress at the Academy of Music, Broad and Locust streets.

10 p. m.

Reception by the President and Officers of the Congress at the Bellevue-Stratford Hotel.

TUESDAY, AUGUST 24, 6:30 p. m.

Dinner of the Officers of the Congress, Officers of the Sections, the Committee on Organization, the Committee on Local Arrangements, Official Delegates from other countries and their wives and invited guests at the Bellevue-Stratford Hotel.

9 p. m.

Entertainment of all members of the Congress and registered visitors either by the profession of Pennsylvania and Philadelphia, or by the American Dental Association (to be determined later).

WEDNESDAY, AUGUST 25, 4:30 p. m.

Excursion by special train or trains to Atlantic City, N. J., arranged by the Committee on Local Arrangements for the convenience of members of the Congress and visitors. Railroad tickets will be on sale at a special rate at Congress

headquarters in the Commercial Museum. The special trains will leave Atlantic City for the return journey at 11 o'clock, which permits the enjoyment of the whole evening in this city by the sea. Members and visitors are expected to make their own arrangements as to dinner, and are free to spend the evening in accordance with their own tastes. An evening entertainment on one of the ocean piers will be provided for those who wish to attend.

The entertainment of the women who are in attendance is under the direction of a committee, of which Mrs. Matthew H. Cryer is chairman. It is intended to provide a wide range of opportunity for enjoyment at such times as the formal meetings of the Congress are in progress, in addition to the evening functions listed herein. Among the projected excursions are trips to Valley Forge, and to the Dupont Gardens near Wilmington, and sight seeing trips to the points of historical interest in the city. Provision will also be made for visiting the stores and shops or the Sesquicentennial Exhibition. A luncheon party at which Mrs. Sheppard W. Foster, wife of the President of The American Dental Association will act as hostess for the Association, will be arranged for one day of the Congress week.

United States Mint, the principal money factory of the United States government, which will be open to visitors to the Seventh International Dental Congress.

THURSDAY, AUGUST 26.

The earlier portion of this evening is left open for dinners by fraternities and other dental organizations and for private dinners, which it is requested shall terminate not later than 9 o'clock.

9:30 p. m.

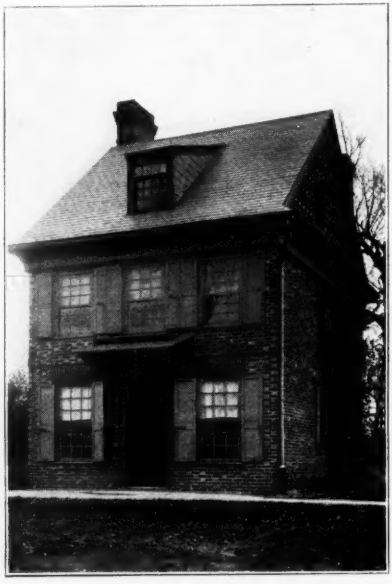
Reception by the President and Officers of the American Dental Association at the Bellevue-Stratford Hotel or within the grounds of the Sesquicentennial Exhibition, or an entertainment given by the dental profession of Pennsylvania and Philadelphia (to be determined later).

FRIDAY, AUGUST 27, 8 p. m.

Closing general meeting of the Congress in the ball room of the Bellevue-Stratford Hotel.

Members and visitors who have not already done so are urgently requested to make their hotel reservations immediately, in accordance with the previously published list of the Local Committee on Hotels. A list of such is printed in the March and April issues of THE JOURNAL. Special attention is called to the opportunity provided by the University of Pennsylvania for men to secure quarters in the university dormitories at a moderate charge. These buildings are within five minutes' walk of the Commercial Museum.

It has been the policy of the Committee on Local Arrangements in conjunction with the Committee on Organization to discourage the scheduling of the meeting of any other organizations of dentists during the Congress week. Happily, all the bodies to whom this suggestion has been made have cordially acquiesced, so that no conflicting meeting will interfere with the participation of any one in that portion of the Congress work in



Cottage of William Penn.

which he is interested. It has been necessary to provide for short business sessions of the International Dental Federation, the American Dental Association and the Pennsylvania State Dental Society at times when the Congress is not in session, but these are the only meetings which have been approved, and they are necessary for the conduct of the affairs of these organizations.

The dentists of Philadelphia and of Pennsylvania cordially welcome their professional colleagues and their families and friends to the "City of Brotherly Love" and hope that their visit may be both pleasant and profitable.

CHARLES R. TURNER, *Chairman.*

ANNOUNCEMENT OF THE COMMITTEE ON ORGANIZATION

The majority of the European members of the Congress will arrive in New York City not later than Friday, August 20, via S.S. Noordam and S.S. Cleveland. (See announcement of American Express Company, page 905).

The Waldorf Astoria Hotel will be the New York headquarters.

On Saturday evening, August 21, in New York City, a banquet will be tendered to the visiting guests from other nations by the local profession.

A special train via the Pennsylvania Railroad will leave New York City, Sunday, August 22, at 2:35 p. m. and arrive in Philadelphia at 4:35 p. m.

Sunday, August 22 (Bellevue-Stratford Hotel)

3 to 5 p. m.

Conference of Committee on Organization, officers of Sections, Committee on Local Arrangements and state advisory committees.

8:30 to 10:00 p. m.

Informal Reception by the Committee on Organization to the members of the International Dental Federation.

Monday, August 23 (Bellevue-Stratford Hotel)

8:30 to 10:00 a. m.

Meeting of International Dental Federation*

9 to 10 a. m.

Informal reception by the officers of each Section in their respective section rooms to the essayists participating in their programs, and in general to all members of the Congress.

*The International Dental Federation is a permanent international body existing in the interim between International Dental Congresses.

Article 5. The General meeting of the International Dental Federation will take place before the opening of each International Dental Congress. It will consist of the Executive Council, the various Commissions, and all who have been regularly admitted as members of the International Dental Federation. Persons enrolled as members of the International Dental Congress may attend this meeting as guests.

A Special Committee appointed by the Committee on Organization of the Seventh International Dental Congress will be appointed to receive all documents and records of the International Dental Federation at the close of this meeting, in accordance with the regulations governing the F. D. I.—The Statutes, Rules, Regulations and Standing Orders of the International Dental Federation.

10 a. m. to 12 m.

Opening of Seventh International Dental Congress, First meeting of the scientific program (See section program, page 833).

Monday, August 23

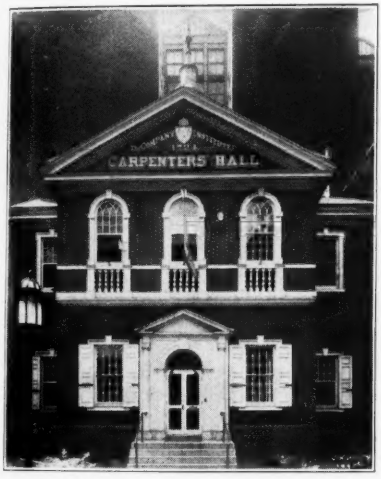
2 to 5 p. m.

Second meeting of the scientific program (See section program, page 833).

Monday, August 23 (Academy of Music)

8:30 to 10:15 p. m.

First General meeting of the Congress.



Carpenters' Hall, meeting place of the First Continental Congress, Sept. 5, 1774.

Address by President of the Seventh International Dental Congress

Address by President of the American Dental Association

Roll Call of nations.

Introduction of noted members of the profession from other nations

Announcements by the chairman of the Committee on Local Arrangements

Adjournment

10:30 p. m.

Formal reception to the President of the Congress and the officers of the Committee of Organization. Dancing will follow. *(Bellevue-Stratford Hotel)*

Tuesday, August 24

9 a. m. to 12 m.

Third meeting of the scientific program (See section program, page 833).

2 to 5 p. m.

Fourth meeting of the scientific program (See section program, page 833).

7 to 9 p. m.

Formal congressional banquet, tendered by the Committee on Organization and Committee on Local Arrangements to members and guests from other nations, Section officers, Past Presidents of the American Dental Association, past presidents of the National Board of Dental Examiners and their wives, under the immediate supervision of the Committee on Local Arrangements. *(Bellevue-Stratford Hotel)*

9 p. m.

Dancing and special entertainment to all members of the Congress, tendered by the local profession under the immediate supervision of the Committee on Local Arrangements. (Place to be announced later)

Wednesday, August 25

9 a. m. to 12 m.

Fifth meeting of the scientific program (See section program, page 833).

2:00 to 4:15 p. m.

Sixth meeting of the scientific program (See section program, page 834).

4:30 p. m.

Trip to Atlantic City by special train from Broad Street Station, returning about midnight (See details on page 886).

Thursday, August 26

9 a. m. to 12 m.

Seventh meeting of the scientific program (See section program, page 834).

2 to 5 p. m.

Eighth meeting of the scientific program (See section program, page 834).

6:30 to 9:00 p. m.

Fraternity dinners

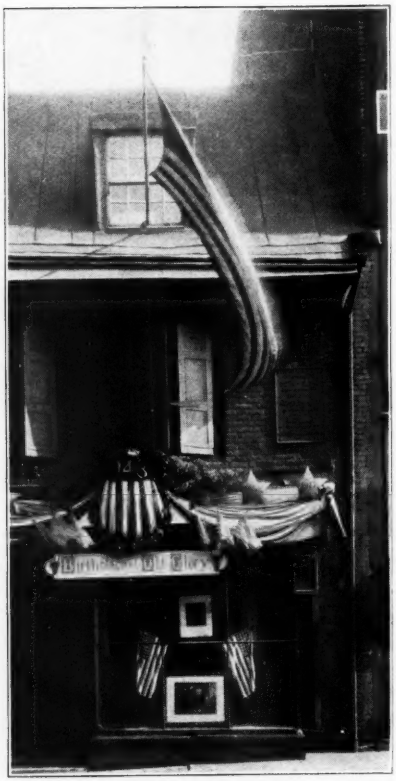
9 p. m.

Dance and special entertainment to all members of the Congress, tendered by the American Dental Association under the immediate supervision of its officers.

Friday, August 27

9 a. m to 12 m. and 2 to 5 p. m.

The American Dental Association will provide the program for the entire morning and afternoon sessions on Friday which will be devoted to table clinics.



Home of Betsy Ross, who here made the first American flag.

Whereas undoubtedly there will be clinicians representative of every nation, the majority of them will be members of the American Dental Association. The groups representing the dental schools have been secured by a special committee, while the representatives on the clinical program for each state have been nominated by the state advisory committees, their number being restricted to twice the number of delegates each state is authorized to have in the House of Delegates of the American Dental Association.

Friday, August 27

8 p. m.

Formal closing exercises of the Congress (In accordance with the Rules and Regulations of the International Dental Federation governing said meeting)

After final adjournment of the Congress, the visiting members desiring to take the Special Delegates' Tour, as provided by the American Express Company (see page 905) will depart at midnight for Washington.

Saturday, August 28

Saturday will be spent in Washington with sight-seeing trips, under the direction of the American Express Company assisted by the local profession. Headquarters: New Willard Hotel.

Sunday, August 29

The special train will arrive in Pittsburgh in the early morning. There will be motor sightseeing trips to points of interest, and a banquet by the local profession in the evening. Headquarters: William Penn Hotel.

Monday, August 30
Tuesday, August 31

Monday and Tuesday will be spent in Chicago. There will be motor sightseeing trips throughout the city, with a banquet by the local profession on Tuesday evening. Headquarters: Congress Hotel.

Wednesday, September 1

Arriving in Detroit at 8:30 a. m., the party will be taken on a motor trip through the city and on a visit to the Ford Motor Factory. In the evening the local profession will tender a banquet. Headquarters: Statler Hotel.

Thursday, September 2

Leaving Detroit in the early morning, the party will stop at Niagara Falls, where an excursion will be made around the Niagara Gorge. At noon, the train will leave for Rochester Dental Infirmary. An afternoon tea will be tendered the visitors by the local profession.

Friday, September 3

Arriving in Boston in the early morning, the party will enjoy special motor sightseeing trips, including visits to Forsyth Dental In-

firmary, Harvard University and points of historic interest. There will be a banquet in the evening by the local profession. Headquarters: Copley-Plaza Hotel.

Saturday, September 4

Returning to New York, Saturday morning, the party will sail at 11:00 a. m. via S.S. Noordam.

REPORT OF THE COMMITTEE ON HISTORICAL AND SCIENTIFIC EXHIBITS

The committee is confident that most excellent displays under both the historical and scientific classifications of exhibits will be assembled for presentation before the International Dental Congress in August. The gathering together of comprehensive displays is well under way. Detailed summary of the exhibits is, of course, impossible at the present time, but there are certain features which can be definitely enumerated.

These are such as the exhibits to be shown by the U. S. Army Dental Corps, the U. S. Navy Dental Corps and the Dental Division of the United States Public Health Service, in all of which exhaustive and illuminative displays are a certainty. These are being assembled and will be displayed through the generous cooperation of the Surgeons-General of the Army, the Navy and the U. S. Public Health Service.

The government exhibits will bring out many features which have never been stressed before and these displays will be of great educational value.

ARMY DENTAL CORPS

The Army Dental Corps Exhibit will include photographs, radiograms, casts and appliances used in actual cases of gunshot wounds and injuries of war and peace, and the final results in these cases. The Army Dental School will have a pictorial exhibit of buildings, clinics, laboratories, etc., showing activities in dental research. At least three officers will be present to demonstrate dental equipment for field use, and while this demonstration will not be presented as a clinic, it will be in the nature of such. The different types of splints used in connection with maxillofacial surgery, methods of teaching professional procedure in the Army Dental School, dental research work and the field dental equipment sets developed at the Developmental Laboratory at the Medical Field Service School since the war will be exhibited and demonstrated.

The bronze bust of Dr. Horace Wells, discoverer of anesthesia, which was cast and erected through popular subscription of the dental profession of America and which now stands in the museum of the Army Dental Corps in the national capital will also form a part of this exhibit.

NAVY DENTAL CORPS

The Naval Dental Corps exhibit will occupy a space directly off the lobby of the large room assigned for the scientific and health exhibits, adjacent to the registration space. This exhibit will include the simulation of a dental operating room on board a first-line ship of the Navy, and other interesting features pertaining to the activities of the Naval Dental Corps.

Pictures of dental operating rooms on board ships of the navy and at naval shore stations within and beyond the territorial limits of the United States, including photographs of the dental and oral surgical ward at the U. S. Naval Hospital, Norfolk, Va., will be displayed. Mounted portions of the Navy health record, dental abstract sheet and graphic instructions for the preparation of the dental abstract sheet will show the manner in which records of the dental condition of every naval officer and enlisted man are made and kept up to date as long as the individuals remain in the naval service.

The dental educational activities of the Navy will be depicted in views of the Naval Dental School. Photographs will show interesting features of the postgraduate instruction of naval dental officers and the training of dental technicians. The latter are enlisted men who are selected from the ranks of the Hospital Corps and trained as operative assistants, laboratory mechanics and dental hygienists. Models and appliances used in the course of instruction will be exhibited.

Motion pictures of the Naval Dental School and of other naval activities will be shown.

U. S. BUREAU OF PUBLIC HEALTH SERVICE

The exhibit of the U. S. Bureau of Public Health Service will take the form of a model hospital operating room, which is a duplicate of the dental installation in all the hospitals of the service. There will also be charts and diagrams with reference to the investigation of the prevalence of dental caries in different parts of the United States, and some of the

results found among school children. Several posters and bulletins showing the results of dental caries in relation to general health and a list of Public Health Service publications of all kinds, including radio talks, will also be shown. Several reels from the motion picture "The Science of Life" will be shown.

NEW YORK UNIVERSITY COLLEGE OF DENTISTRY

The New York University College of Dentistry will present the following exhibits:

Sec. 1. Microscopic Sections, photomicrographs, and lantern slides of dental pathologic specimens. Exhibit of drugs in dental materia medica and therapeutics.

Sec. 7. Models showing steps in the performance of oral surgical operations. Radiograms of pathologic conditions of the jaws.

Sec. 10. Moulages showing diseases of the oral mucous membrane and tongue.

Sec. 11. Lantern slides and demonstration models illustrating periodontal disease and traumatic occlusion.

Sec. 12. Chart exhibits of methods of instruction of the public in principles of mouth hygiene.

Sec. 13. Infirmary diagnostic chart. Outlines of laboratory courses. Notebooks of laboratory courses. Mannikin head exhibit. Pulp canal technic exhibit.

HARVARD UNIVERSITY

Harvard University will present an exhibit of charts and models.

HOWARD UNIVERSITY COLLEGE OF DENTISTRY

Table clinics embracing operative technic will be presented showing tooth sections, carvings in plaster, clay and bone, cavity preparations, etc., prosthetic technic showing latest methods of impression work, contour and occlusion models and the setting up of teeth; crown and bridgework showing inlays, three-fourths crown and latest type bridgework restorations.

Operative clinic at the Naval Dental School.

OTHER EXHIBITS

Dr. Vilray P. Blair, of St. Louis, Mo., will have an exhibition of his plaster casts, photographs, etc., illustrating the correction of harelip. Dr. William H. Gilmour of Liverpool University expects to present a number of interesting old bone dentures, instruments, etc.

An important display will be one from the Mayo Foundation, of Rochester, Minnesota, under the supervision of Dr. Boyd Gardner.

The Deaner Institute of Kansas City, Mo., will present, under the direction of Dr. Russell Haden, an exhibit showing the results of a comprehensive study of periapical infections.

The committee is also highly gratified to

announce it has obtained the famous collection of anatomic specimens of the late M. H. Cryer, and also a large exhibit from Prof. Dr. B. Gottlieb of Vienna, consisting of from 100 to 150 photomicrographs illustrating the results of the recent work of his laboratory.

The committee aims to develop to a high degree the historical exhibit and has already made such progress as to insure a display of unusual merit.

The progress of dental education will be prominent in the historical and scientific display, and in this the institutions of dental learning and training in this country and abroad are perfecting ambitious plans for participation. All have been invited by the committee and responses are most encouraging.

O. G. L. LEWIS, *Chairman.*

MOUTH HYGIENE AND PUBLIC HEALTH EXHIBIT

Under the direction of Section XI

This exhibit will cover all the methods employed by the different dental agencies to teach mouth hygiene and preventive dentistry, and will also show many other allied activities in which the dental profession is interested.

The exhibitors will come from all parts of the world and will show the many different methods employed in their work. Besides many local child welfare and health agencies, the following organizations have secured space:

Department of Dental Health Education, American Dental Association

Pennsylvania State Department of Health and Pennsylvania State Dental Society

Travelers Insurance Company

Michigan State Department of Health

Kansas State Dental Association

Illinois State Dental Society

International Harvester Company

National Child Welfare Association

The American Dental Hygienists Association

California State Dental Association

California Dental Hygienists Association

American National Red Cross

Metropolitan Life Insurance Company

National Safety Council

The Ohio State Dental Hygienists Association

The Colorado State Dental Association

The Colorado Dental Hygienists Association

American Medical Association

Mississippi State Board of Health

American Society for Control of Cancer

Texas State Dental Society

The Rochester Dental Dispensary

The Lion Dental Infirmary, Japan

The Danish Society for Dental care of Children

Cleveland Public Schools

University of Louisville

Dental Society of the State of New York

New York State Dental Hygienists Association

Connecticut Dental Hygienists Association

Ohio State Dental Society

Minnesota State Dental Hygienists

National Lamp Company

Maine Dental Hygienists Association

Massachusetts Hygienists Association

The Endicott Johnson Corporation.

E. L. PETTIBONE, *Chairman.*

TRANSPORTATION TO THE PHILADELPHIA MEETING

Practically all of the railroads of the United States have agreed on a rate of one and one-half fare round trip to the Sesquicentennial. This will be available for the members of the American Dental Association. No certificates will be issued this year. Tickets will be on sale daily from May 29 to November 30. In the territory of the New England and Trunk Line Associations (east of Buffalo and Pittsburgh), round trip tickets will be sold with a return limit of ten days. In the territory of the Central and Southeastern Passenger Associations, the time limit will be fifteen days. In the Western and Southwestern Passenger Associations, the time limit will be fifteen days, east of the Missouri River. For Missouri River points and territory west, a time limit of thirty days will be given. From Pacific coast points, summer excursion tickets will be on sale from May 27 to September 15, limited for return to October 31. The fare from all coast points is practically the same, $149.22, which is somewhat better than the convention rate of one and one-half fare.

D. C. BACON, *Chairman*
Transportation Committee.

EXHIBITORS

The Abbott Laboratories, North Chicago, Ill.

Julius Aderer, Inc., 115 W. 45th St., New York City.

The Alkalol Co., Taunton, Mass.

The American Cabinet Co., Two Rivers, Wis.

W. V-B. Ames Co., Fremont, Ohio.

The Antidolor Mfg. Co., Springville, N. Y.

Claudius Ash Sons & Co., U. S. A., Inc., 1-3 Union Square West, New York City.

The Barkmeyer Electrical Laboratory, 549 W. Washington Blvd., Chicago, Ill.

The Bayer Company, Inc., 117 Hudson St., New York City.

Becton, Dickinson & Co., Rutherford, N. J.

The Berry Dental Laboratory Co., Equitable Bldg., St. Louis, Mo.

Frank S. Betz Company, Hammond, Ind.

Henry P. Boos, 608 Nicollet Ave., Minneapolis, Minn.

Harry J. Bosworth Co., 341 E. Ohio St., Chicago, Ill.

Bristol-Meyers Co., 40 Rector St., New York City.

Buck X Ograph Co., 6629 Olive St. Rd., St. Louis, Mo.

Buffalo Dental Mfg. Co., 587 Main St., Buffalo, N. Y.

Burdick Cabinet Co., Milton, Wis.

Burns Dental Casting Machine Co., Inc., 88 State St., Flushing, N. Y.

Dr. John O. Butler, 1180 E. 63rd St., Chicago, Ill.

Cameron's Surgical Specialty Co., 666 W. Division St., Chicago, Ill.

Castle Wilmot Co., 1155 University Ave., Rochester, N. Y.

The L. D. Caulk Company, Milford, Del.

Caulk's Special, Milford, Del.

Chayes Dental Instrument Corporation, 1650 Broadway, New York City.

The Cleveland Dental Mfg. Co., 3307 Scranton Road, S. W., Cleveland, Ohio.

Climax Dental Supply Co., 1213 Walnut St., Philadelphia, Pa.

Coe Laboratories, 25 E. Washington St., Chicago, Ill.

Colgate & Company, 581 5th Ave., New York City.

Columbia X Ray & Electric Corporation, 131 E. 23rd St., New York City.

Columbus Dental Mfg. Co., Wager & Jackson St., Columbus, Ohio.

P. N. Condit, 120 Boylston St., Boston, Mass.

Connecticut Coat & Cover Co., Inc., 31 Hill Street, Shelton, Conn.

Cook Laboratories, Inc., 536 Lake Shore Drive, Chicago, Ill.

Corega Chemical Co., 208 St. Clair Ave., Cleveland, Ohio.

Thomas J. Dee & Co., 5 S. Wabash Ave., Chicago, Ill.

Dental Products Co., 623 S. Wabash Ave., Chicago, Ill.

Dental Specialty Co., 1638 California St., Denver, Colo.

The Dentists Supply Co., 220 W. 42nd St., New York City.

Denver Chemical Mfg. Co., 20-24 Grand St., New York City.

Detroit Dental Manufacturing Co., 6081 12th St., Detroit, Mich.

The Dresch Laboratories Co., Nasby Bldg., Toledo, Ohio.

August E. Drucker Co., 2679 California St., San Francisco, Calif.

Eastman Kodak Co., 343 State St., Rochester, N. Y.

Electro Dental Manufacturing Co., 33rd & Arch St., Philadelphia, Pa.

H. Fischer & Company, Inc., 792 Lexington Ave., New York City.

Flossy Dental Mfg. Co., Evanston, Ill.

The Foregger Company, 47 W. 42nd St., New York City.

Friedman Specialty Co., 25 E. Washington St., Chicago, Ill.

Grant Dental Mfg. Co., 403 Baltimore W. Cor. Cass Street, Detroit, Mich.

Hall & Ruckel, Inc., 241 37th St., Brooklyn, N. Y.

Hanau Engineering Co., 951 W. Ferry St., Buffalo, N. Y.

Hance Brothers & White, Inc., 623 Callowhill St., Philadelphia, Pa.

Hanovia Chemical & Manufacturing Co., Chestnut St. & N. J. R. R. Ave., Newark, N. J.

The Harvard Co., 2206 13th St., Canton, Ohio.

The Heidbrink Company, 420 S. 6th St., Minneapolis, Minn.

The Hoffmann-La Roche Chemical Works, 17-21 Cliff St., New York City.

Horlick's Malted Milk Co., Racine, Wis.
Dr. M. M. House, 105 Hunter Ave., Kansas City, Mo.
The Hu-Friedy Mfg. Co., 3654 Milwaukee Ave., Chicago, Ill.

Ideal Tooth Corporation, Cambridge, Mass.
J. W. Ivory, 42 N. 11th St., Philadelphia, Pa.

J. F. Jelenko & Co., 136 W. 52nd St., New York City.
Johnson & Johnson, New Brunswick, N. J.
H. D. Justi & Son, 32nd & Spring Garden St., Philadelphia, Pa.

The Kolynos Company, Box 1900, New Haven, Conn.

Lambert Pharmacal Co., St. Louis, Mo.
H. R. Lathrop & Co., Inc., 116 Beekman St., New York City.
Lavoris Chemical Company, 918 N. 3rd St., Minneapolis, Minn.
Lea & Febiger, 600 S. Washington Sq., Philadelphia, Pa.
Lehn & Fink, Inc., Bloomfield, N. J.
Lochhead Laboratories, Inc., 114 W. 44th St., New York City.

E. J. McCormick Rubber Co., Waterhouse Bldg., Passaic & Canal St., Passaic, N. J.
The Medical Protective Co., Fort Wayne, Ind.
The Wm. S. Merrell Co., 5th & Pike, Cincinnati, Ohio.
H. A. Metz Laboratories, Inc., 122 Hudson St., New York City.
Mizzy, Inc., 105 E. 16th St., New York City.
The C. V. Mosby Company, 3616 Washington Blvd., St. Louis, Mo.
J. Bird Moyer Co., Inc., 1210 Vine St., Philadelphia, Pa.
Mynol Chemical Co., Real Estate Trust Bldg., Philadelphia, Pa.

New Mix Products, Inc., 11 W. 45th St., New York City.
The J. M. Ney Company, Elm & West Sts., Hartford, Conn.
Novocol Chemical Mfg. Co., Inc., 2921 Atlantic Ave., Brooklyn, N. Y.

The Pelton & Crane Co., 632-642 Harper Ave., Detroit, Mich.
The Pepsodent Company, 1104 S. Wabash Ave., Chicago, Ill.

Charles H. Phillips Chemical Co., 80 Varick St., New York City.
Poloris Company, Inc., 79 E. 61st St., New York City.
Prometheus Electric Corp., 356 W. 13th St., New York City.
Pro-phy-lac-tic Brush Co., Florence, Mass.

The Ransom & Randolph Co., Toledo, Ohio.
Ritter Dental Manufacturing Co., Inc., 404 West Ave., Rochester, N. Y.

Schering & Glatz, Inc., 150-152 Maiden Lane, New York City.
E. E. Smith Co., 1232 Race St., Philadelphia, Pa.
Lee S. Smith & Son Mfg. Co., Keenan Bldg., Pittsburgh, Pa.
Specialty Mfg. Co., 39-45 Front St., Brooklyn, N. Y.
Spyco Smelting & Refining Co., 51 S. 3rd St., Minneapolis, Minn.
E. R. Squibb & Son, 80 Beekman St., New York City.
I. Stern & Co., 106 W. 116th St., New York City.
St. Paul Welding & Mfg. Co., 174 W. 3rd St., St. Paul, Minn.
Stratford-Cookson Co., 4058 Haverford Ave., Philadelphia, Pa.
Sam'l G. Supplee & Co., 17-19 Union Square, New York City.

L. A. & W. H. Thoenebe, 1513 N. 13th St., Philadelphia, Pa.
Toledo Technical Appliance Co., 2228 Ashland Ave., Toledo, Ohio.

Universal Dental Co., Brown at 48th St., Philadelphia, Pa.

Vernon Brothers & Company, 214 Stanwix St., Pittsburgh, Pa.
Victor X Ray Corporation, 2012 W. Jackson St., Chicago, Ill.
Vibro Dental Products, Inc., Philadelphia, Pa.

The Weber Dental Manufacturing Co., Cherry & 4th St., Canton, Ohio.
The S. S. White Dental Mfg. Co., 211-217 S. 12th St., Philadelphia, Pa.
The Williams Gold Refining Co., 2978 Main St., Buffalo, N. Y.
Wilmot Castle Co., 1155 University Ave., Rochester, N. Y.
Winthrop Chemical Co., Inc., 117 Hudson St., New York City.

The Officers of the Seventh International Dental Congress and the Organization Committee of Thirty.

Committee on Local Arrangements, Seventh International Dental Congress, Philadelphia, Pa., Aug. 23-27, 1926.

Announcements

CALENDAR OF MEETINGS*

NATIONAL SOCIETIES

American Academy of Periodontology, August 20-21, 1926, New York City.

American Dental Assistants Association, August 19-21, 1926, Philadelphia, Pennsylvania.

American Dental Golf Association, August 23, 1926, Philadelphia, Pennsylvania.

American Dental Hygienists Association, August 23-28, 1926, Philadelphia, Pennsylvania.

American Society of Oral Surgeons and Exodontists, August 20-21, 1926, Philadelphia, Pennsylvania.

American Society of Orthodontists, August 16, 1926, New York City.

Federation of American Women Dentists, August 23-26, 1926, Philadelphia, Pennsylvania.

First International Orthodontic Congress, August 16-20, 1926, New York City.

International Orthodontic Congress, August 16-20, 1926, New York City.

Pacific Coast Dental Conference, June 21-26, 1926, Portland, Oregon.

Seventh International Dental Congress, August 23-27, 1926, Philadelphia, Pennsylvania.

Canadian Dental Association, August 16-19, 1926, Halifax, N. S.

*Announcements must be received by the ninth of the month in order to be published in the forthcoming issue of THE JOURNAL.

STATE SOCIETIES

District of Columbia, at George Washington University, Washington, D. C., second and fourth Tuesdays in each month from October to June, inclusive.

National Capital at Washington, D. C., first Tuesday of every month.

June (1926)

California, at Portland, Ore.
Colorado, at Colorado Springs (9-12).
Georgia, at Savannah (9-11).
Maine, at South Poland (21-23).
Montana, at Helena (15-17).
New Mexico, at Santa Fe (10-15).
Oregon, at Portland.
Washington, at Portland, Ore. (21-26).

July (1926)

Wisconsin at Milwaukee (13-15).
Wyoming, at Lander (12-13).

August (1926)

Pennsylvania, at Philadelphia (23-27).

October (1926)

Florida, at Daytona.

November (1926)

Arizona, at Phoenix.

December (1926)

Nevada, at Reno (4).
Ohio, at Columbus (7).

Odontological Society of Western Pennsylvania, at Pittsburgh, November 29-December 1, 1926.

Northern Ohio Dental Association, at Cleveland, June 7-10, 1926.

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

Alabama, June 21, 1926. Secretary-treasurer, E. W. Patton, 725 First National Bank Building, Birmingham, Alabama.

Arkansas, at Little Rock, June 21-25, 1926. Secretary, Walter E. Hutchinson, Dermott, Arkansas.

California, at Los Angeles, June 26, 1926. Secretary, O. E. Jackson, 155 Kentucky Street, Petaluma, California.

Connecticut, at Hartford, June 24-26, 1926. Recorder, Arthur B. Holmes, 43 Central Avenue, Waterbury, Connecticut.

District of Columbia, at Washington, D. C., June 14-18, 1926. Secretary-treasurer, C. Willard Camalier, Medical Science Building, Washington, D. C.

Florida, at Jacksonville, June 22-26, 1926. Secretary, R. P. Taylor, 114 St. James Building, Jacksonville, Florida.

Indiana, at Indianapolis, June 14, 1926. Secretary, J. M. Hale, Mt. Vernon, Indiana.

Iowa, at Iowa City, June 1-4, 1926.

Kentucky, at Louisville, June 1, 1926. Secretary, J. H. Baldwin, 908 Francis Building, Louisville, Kentucky.

Maine, at Augusta, June 24-26, 1926. Secretary, G. W. MacKay, Millinocket, Maine.

Maryland, at University of Maryland, June 2-4, 1926. Secretary, T. L. McCarriar, 1822 North Charles Street, Baltimore, Maryland.

Massachusetts, at Boston, June 15-19, 1926. Secretary, W. Henry Grant.

Michigan, at Ann Arbor, June 7-12, 1926. Secretary, J. W. Lyons, 617-621 Dwight Building, Jackson, Michigan.

Minnesota, at University of Minnesota, June 15, 1926. Secretary, F. E. Cobb, 601 Donaldson Building, Minneapolis, Minnesota.

Mississippi, at Jackson, June, 1926. Secretary, Reuel May, Jackson, Mississippi.

Missouri, at St. Louis, June 11-15, 1926. George E. Haigh, Jefferson City, Missouri.

Montana, at Helena, July 12-16, 1926. Secretary, Marshall E. Gates, Helena, Montana.

New Jersey, at Trenton, June 28-July 3, 1926. Secretary, John C. Forsyth, 148 W. State Street, Trenton, New Jersey.

New Mexico, at Santa Fe, June 10-12, 1926. Secretary, J. J. Clarke, Artesia, New Mexico.

North Carolina, at Raleigh, June 14, 1926. Secretary, F. L. Hunt, Asheville, North Carolina.

North Dakota, at Fargo, July 13-16, 1926. Secretary, W. E. Hocking, Devils Lake, North Dakota.

Ohio, at Columbus, June 21-26, 1926. Secretary, Ray R. Smith, 327 E. State Street, Columbus, Ohio.

Oklahoma, at Oklahoma City, June 21-24, 1926. Secretary-treasurer, Charles A. Hess, Idabel, Oklahoma.

Pennsylvania, at Philadelphia and Pittsburgh, June 23-26, 1926. Secretary, Alexander H. Reynolds, 4630 Chester Avenue, Philadelphia, Pennsylvania.

Rhode Island, at Providence, June 22-24, 1926. Secretary, Albert L. Midgley, 315 Butler Exchange Building, Providence, Rhode Island.

South Carolina, at Greenville, June 22-26, 1926. Secretary, W. B. Simmons, 107 E. North Street, Greenville, South Carolina.

South Dakota, at Sioux Falls, June 28, 1926. Secretary, G. G. Kimball, Mitchell, South Dakota.

Tennessee, at Nashville, June 21, 1926. Secretary-treasurer, F. W. Meacham, 911 Hamilton National Bank Building, Chattanooga, Tennessee.

Texas, at Houston, June 7-9, 1926. Secretary, G. C. Baker, Kaufman, Texas.

Vermont, at Montpelier, June 28-30, 1926. Secretary, David Manson, Burlington, Vermont.

Wyoming, at Cheyenne, June 28-30, 1926. Secretary, Thew J. Ice, Lock Box 116, Powell, Wyoming.

Department of Registration and Education, State of Illinois, at Chicago, June 15-19, 1926. Superintendent of Registration, V. C. Michels.

THE CONNECTICUT DENTAL COMMISSION

The Connecticut Dental Commission will meet at Hartford, June 24-26, 1926, to examine applicants for license to practice den-

tistry and dental hygiene and to transact any other business proper to come before them. For further information, address

ARTHUR B. HOLMES, *Recorder*,
43 Central Ave.,
Waterbury, Conn.

MASSACHUSETTS BOARD OF DENTAL EXAMINERS

The Massachusetts Board of Dental Examiners will hold an examination for registration for both dentists and oral hygienists, in the City of Boston, June 15-19, 1926. Full information, application blanks, etc., may be secured at the office of the secretary, Room 146, State House, Boston. All applications must be filed at the office of the secretary at least ten days before the date set for the examination.

W. HENRY GRANT, *Secretary*.

MISSOURI DENTAL BOARD

The next meeting of the Missouri Dental Board will be held, June 11-15, at Washington University, 29th and Locust, St. Louis, Mo. For any further information, address

GEORGE E. HAIGH,
Jefferson City, Mo.

NORTH DAKOTA STATE BOARD OF DENTAL EXAMINERS

The North Dakota State Board of Dental Examiners will hold its next meeting, July 13-16, at Fargo. All applications must be in the hands of the secretary ten days prior to the beginning of the examination. For further information and application blanks, address

W. E. HOCKING, *Secretary*,
Devils Lake, N. D.

PENNSYLVANIA BOARD OF DENTAL EXAMINERS

The next examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh, June 23-26, 1926. The examinations in theory will be held at the Old Musical Fund Hall, 808 Locust Street, Philadelphia, and the University of Pittsburgh, Pittsburgh. The practical examinations will be held on Saturday, June 26, at 8:30 p. m., in the Evans Dental Institute, Philadelphia, and the University of Pittsburgh, Pittsburgh. An examination for hygienists will be held on the same dates, and at the same places. Students who have completed their second year in a dental college may be examined in certain subjects taken in the two years. Application papers may be secured from the Department of Public Instruction, Harrisburg. For further information, address

ALEXANDER H. REYNOLDS, *Secretary*,
4630 Chester Ave.,
Philadelphia, Pa.

VERMONT BOARD OF EXAMINERS

The Vermont State Board of Dental Examiners will meet at Montpelier, Vt., June 28-30, 1926, to examine applicants for license to practice dentistry and dental hygiene. Applications, together with the examination fee of $25, must be in the hands of the secretary not later than June 15. Candidates will present for registration and preliminaries at 11 a. m., Monday, June 28. For further information address

DAVID MANSON, *Secretary*,
Burlington, Vt.

SEVENTH INTERNATIONAL DENTAL CONGRESS

The Seventh International Dental Congress will be held in Philadelphia, August 23-27.

Reduced fare to Philadelphia from all parts of the world is being offered by the steamship companies, railways, tourist agencies, etc., during the summer of 1926. In England, France, Germany, Austria, Italy, Switzerland, Scandinavia, special parties of delegates to the Congress are being formed, and in several instances large parties are chartering steamer accommodations and arranging itineraries of travel to the United States.

The International Dental Congress has, through the American Express Company,* arranged for the chartering of an entire steamer, and for an itinerary of travel in the United States for the party which will sail on this steamer. Delegates can be members of this party at a nominal cost. The itinerary, of course, includes attendance at the Congress.

*Details as to the itinerary will be found in the announcement of the American Express Company, on page 905.

Following the Congress, this party makes a tour of one of the most interesting parts of America, visiting seven of the largest cities in the United States. Tourist directors will accompany the party and sightseeing trips will be made in each city. After sixteen days in America, the party will sail on the Noordam, September 4, from New York.

Another large party of delegates will sail from Hamburg on the S. S. Cleveland, of the Hamburg-American Line, August 5, arriving in New York, August 16. This party, composed mostly of dentists from Central and Northern Europe, has an extensive itinerary of travel in America before sailing home on the same vessel.

There will be present at the Congress from fifteen to twenty thousand dentists, including the most eminent men and women in the science and practice of dentistry. Arrangements are being made to comfortably house everyone. Dental associations, clubs, federations, etc., in various cities are arranging to extend hospitality to foreign delegates who visit their cities before or after the Congress.

In Philadelphia, during the week preceding the convening of the Dental Congress, the Philadelphia Clinic Club is arranging a program of clinics for the foreign delegates. The Congress will be held at the same time as an International Exposition of the arts, sciences, education, social and commercial progress is being held in Philadelphia. The city of Philadelphia, which is the metropolis of the State of Pennsylvania, is the birthplace of the American republic. The city, with the cooperation of the national government of the United States and the governments of the separate states, is holding the Sesquicentennial Celebration and International Exposition, in commemoration of the one hundred and fiftieth anniversary of the signing of the Declaration of Independence, by which the American colonies declared their freedom and the nation was born.

The summer of 1926 will be filled with historic pagentry, large public gatherings and other assemblages in Philadelphia.

The President of the United States, Mr. Calvin Coolidge, will officially open the International Dental Congress.

The Dental Congress will have its own exposition features. There will be shown, in immediate conjunction with the sessions of the Congress, a dental scientific exhibition. There will be a dental public education and health exhibit, and also a dental historical exhibition. A commercial exhibition will show the largest developments in the mechanical side of the profession.

The marvelous advance in oral hygiene and oral surgery in which the dental profession has participated, and has, in fact, led, will be an important theme in the deliberations of the Congress.

Arrangements have been made by the International Congress management that delegates will make inquiries regarding hotel and other accommodations direct to the hotels in Philadelphia. Lists of these hotels are being published in all the dental journals throughout the world.

JAMES E. AIGUIER, *Chairman*,
Press Committee.

THE AMERICAN SOCIETY OF ORAL SURGEONS AND EXODONTISTS

The American Society of Oral Surgeons and Exodontists will meet in Philadelphia, Pa., Aug. 20-21, 1926.

E. C. HUME, *Secretary*,
814 Francis Bldg.,
Louisville, Ky.

AMERICAN DENTAL ASSISTANTS ASSOCIATION

The second annual meeting of the American Dental Assistants Association will be held in Philadelphia, August 19-21, 1926. At each session there will be speakers of prominence. Clinics will be given by members also interesting papers and essays. The annual luncheon will be held on Saturday. Plan now to be present at this meeting.

JULIETTE A. SOUTHARD, *President*,
ANNA H. SYKORA, *General Secretary*,
Suite 1409, 8 West 40th Street,
New York City.

THE ASHEVILLE-NORTH CAROLINA MIDSUMMER CLINIC

The second annual Asheville-North Carolina, Midsummer Clinic will be held this year August 16-18, at Kenilworth Inn. It is important that hotel reservations be made at the same time tickets are purchased. The number is limited and the fee is $15.00. Tickets go on sale June 15.

GEORGE K. PATTERSON, *Secretary*.

PSI OMEGA FRATERNITY

The National Alumni Chapter meets in Philadelphia, Pa., Saturday, Aug. 21, 1926, at the new Pennsylvania Athletic Club, which will be the headquarters for the fraternity. The general session will be held at 2 p. m., Saturday, August 21, for initiatory work; exemplification of degrees; business session and election of officers. The annual banquet for members and ladies will be held at 6 p. m., Thursday, August 26, at the Pennsylvania Athletic Club. Make your reservations early, securing tickets at headquarters before Thursday noon.

ARTHUR R. MCDOWELL, *Grand Master*,
344 Fourteenth Street,
San Francisco, Calif.

R. E. DENNEY, *Secretary*,
915 Medical Arts Bldg.,
Philadelphia, Pa.

FEDERATION OF AMERICAN WOMEN DENTISTS

The Federation of American Women Dentists, will hold its annual meeting August 23-26, 1926, at Philadelphia, Pa., with headquarters at the Bellevue-Stratford Hotel. There will be a luncheon, Monday, August 23, and a banquet will be held at the Bellevue-Stratford Thursday evening, August 27. The Federation extends a cordial welcome to all ethical women dentists.

DELAN KINNEY, *Chairman*,
Publicity Committee,
576 Fifth Ave., New York City.

THE FIRST INTERNATIONAL ORTHODONTIC CONGRESS

The First International Orthodontic Congress will be held at the Hotel Commodore, New York City, Aug. 16-20, 1926. More than twenty-five scientific papers will be presented by orthodontists from America and abroad. There will also be fifty table clinics, fifteen photographic and radiographic exhibits and educational clinics, conducted in class form. Membership in this congress entitles the holder to a bound copy of the proceedings. For further information address

WILLIAM C. FISHER, *President General*,
501 Fifth Ave., New York City.

PACIFIC COAST DENTAL CONFERENCE

The First Pacific Coast Dental Conference will be held in Portland, Ore., June 21-26, 1926. Manufacturers and supply dealers are making extensive preparations for displays, and much attention is being given to entertainment features.

L. A. MORRIS, *Chairman*,
Publicity Committee,
Oregon City, Ore.

SEVENTH INTERNATIONAL DENTAL CONGRESS

Philadelphia, August 23-27, 1926

The Seventh International Dental Congress will be notable for its exposition features directly related to dentistry. It is to be held in the city where an international exposition of the arts, sciences, education, social and commercial progress is under way which will be of vast interest to the fifteen to twenty thousand dentists who will attend the Congress.

The dental profession will, however, have its own exposition in immediate conjunction with the Congress. Five important and large exhibits will be shown: (1) a dental scientific exhibit; (2) a dental public education and health exhibit; (3) a dental historical exhibit; (4) a government exhibit, and (5) a commercial exhibit.

The historical and scientific exhibit will be the most exhaustive display illustrative of the advancement of dentistry that have ever been shown, comprising objects of unusual interest in every department of dentistry.

In the section relating to the history of dentistry, many relics of the early practice of dentistry are to be exhibited.

Philadelphia is rich in historical association with the practice of dentistry. Here there practiced, LeMaire, the French surgeon and dentist who is considered the pioneer dental preceptor of America; Gardette, a pupil of LeMaire; Hudson, who was instrumental in the organization of dentistry as a profession; Koecker, pioneer dentist and author of works on dental practice and others. Here lived Charles Wilson Peale, the famous early American artist, who in his latter years turned his attention to experiments which interested others in the development of porcelain teeth.

Military dental surgery will be an impor-

tant part of the exhibition, which will be the profession's initial opportunity of viewing the results of the war experience of the dentists who served in field and camp. Dental science in Europe will contribute extensively to this section of the exhibition.

The exhibits will be placed in buildings of the Commercial Museum, a group of permanent exposition buildings, including one of the largest and best equipped convention halls in the country, and in whose vast assembly hall the deliberations of the Congress will be held. The Museum is located in a part of the city within ten minutes' car ride of the heart of the city and immediately adjacent to the University of Pennsylvania, whose many buildings are amidst scenically pleasant surroundings. The Thomas W. Evans Institute and Museum of Dental Science and the University of Pennsylvania Dental School are among the buildings adjacent. The university student dormitories, which have been placed at the disposal of the visiting dentists, are immediately adjoining the Commercial Museum area. West Philadelphia Station on the main line of the Pennsylvania Railroad, bringing travelers from north, south and west, is within a five-minute ride of the convention hall.

Modern hotels, of large capacity, apartment houses and a vast residential district where rooming accommodations of all types can be obtained, are located in the West Philadelphia section of the city, adjacent to the convention building. In the neighborhood surrounding the University of Pennsylvania are hundreds of students' boarding houses and fraternity houses, which will be at the disposal of the Dental Congress delegates.

The exposition grounds of the Sesquicentennial Exposition and the center of the city are easily accessible by fast surface and subway transit lines from the convention hall.

It is confidently expected that this will be the largest assembly of dentists ever known in the history of the profession.

JAMES E. AIGUIER, *Chairman*,
Press Committee.

DELTA SIGMA DELTA FRATERNITY

The forty-second annual meeting of the Supreme Chapter of Delta Sigma Delta Fraternity will be held in the Clover Room of the Bellevue-Stratford Hotel, Philadelphia, Pa., Friday, August 20, 1926, at 9:30 a. m. Matters of great importance to the fraternity will come up for discussion during the morning and afternoon sessions, and it is hoped that a large attendance will be present. The morning session will be followed by a luncheon given by the Supreme Chapter. The initiation ceremonies will be held during the afternoon session. The banquet will be held on Thursday, August 26, in the ball room of the Bellevue-Stratford Hotel at 6:30 p. m.

R. M. SEIBEL, *Supreme Grand Master.*
R. HAMILL D. SWING, *Supreme Scribe.*

SOUTHWESTERN SOCIETY OF ORTHODONTISTS—CHANGE OF DATES

The meeting of the Southwestern Society of Orthodontists will begin at 9 a. m., August 4, at Houston, Texas, continuing through August 6, with headquarters at the Rice Hotel. Saturday, August 7, the party taking the boat trip to New York will sail from Galveston at 3 p. m., aboard the S. S. San Jacinto. It is necessary to forward $20.00 to Dr. Arnold with application for reservation. However, round trip tickets will be purchased over any railroad to Houston, Mallory line to New York, and return home over any railroad desired. Deposit of $20 will be returned in full on sailing date. Rates for round trip are as follows: From Kansas City, $126.77; Omaha, $141.11; Tulsa and Oklahoma City, $126.77; Waco, $123.26; Chicago, $137; Detroit, $136.76; Nashville and Montgomery, via Keywest, $95 or less, via Houston, $129; Amarillo, $141; Denver, $173; Dallas and Ft. Worth, $121. If by auto, the boat rate from Galveston to New York is $63 per person; auto freight rate, $1.38 per hundred pounds. For further information, address

P. G. SPENCER, *Secretary*,
510 Amicable Bldg.,
Waco, Texas.

REUNION OF BALTIMORE COLLEGE OF DENTAL SURGERY ALUMNI

A reunion of the Alumni of the Baltimore College of Dental Surgery, the Dental Department of the Baltimore Medical College and the University of Maryland School of Dentistry will be held in Philadelphia in conjunction with the International Dental Congress, Aug. 26-27, 1926. The Bellevue-Stratford Hotel will be the official headquar-

ters of these united alumni associations, and it is recommended that graduates of the above named schools make hotel reservations at once. Detailed information regarding this reunion will be furnished the alumni at a later date. It is our desire to have every graduate correctly listed on the roster. Should you not receive an official communication from the committee before June 15, we should appreciate it if you would advise Dr. O. H. Gaver, Secretary, Commonwealth Bank Building, Baltimore, regarding your present address and the school from which you graduated, as well as year of graduation. The united associations are now known as the Alumni Association of the Baltimore College of Dental Surgery, Dental School of the University of Maryland.

FRANK P. DUFFY, *President.*
O. H. GAVER, *Secretary.*

NORTHERN AND SOUTHERN CALIFORNIA DENTAL GOLF TOURNAMENT

The fifth annual California State Dental Golf Tournament will be held at Del Monte, June 11-13, 1926. Southern California is planning a motor caravan instead of a special train as in the past. The motor trip is planned to take care of the recent graduates from school, on whom the expense of transportation might work a hardship. Lunch will be served at Wilshire Country Club 12 m.-2 p. m., preceding the start, Wednesday, June 9. Motor officers will guide us to outside of Los Angeles County. Dinner will be served at 5:30 p. m., at El Paso dining room, Dela Gurra Street, next to the City Hall in Santa Barbara, where the dental golfers will join in our caravan. After dinner we shall drive to Santa Maria and stop at the Santa Maria Inn. Breakfast will be served at 7 the next morning, and we shall reach the Alpine Inn at Gonzales in time for lunch. After lunch, an hour's run will bring us to Del Monte, where three days' vacation and entertainment under the auspices of the Northern California Dental Golf Association will be enjoyed. Any members of the dental profession are more than welcome to join us. Special rates will prevail at the Del Monte Hotel. Following is the golf program:

Friday, June 11:

Team match, North vs. South, for Perpetual Cup.

Twosomes in the morning. Foursomes in the afternoon.

7 p. m. Calcutta Pool, Charles Benbrook conducting.

Saturday morning, June 12:

Play for Calcutta Pool.

First 18 holes of 36 for championship, low 16 to qualify for final 18 at Pebble Beach, Sunday morning. (Prizes for low gross and low net in A, B and C classes.)

Saturday afternoon:

Best ball foursomes. (Prizes in all classes.)

Sunday morning, June 13:

Final 18 holes for dental championship of California. (Championship to be medal play 36 holes.)

FRED D. SCHILDWACHTER, *President,*
Southern California Dental Golf Club.

RESOLUTIONS ON THE DEATH OF DR. JOHN H. DREXLER

Adopted by the North Philadelphia Association of Dental Surgeons, March 10, 1926.

WHEREAS, It has pleased Almighty God, in his infinite wisdom, to remove by death its esteemed and respected member of the profession; and

WHEREAS, This Association has suffered the loss by death of its first past president, Dr. John H. Drexler, which occurred Jan. 17, 1926, and we, the members of this association who have profited so much by his untiring efforts and generous disposition, wish to express its deep and sincere sorrow in his loss; therefore be it

Resolved, That this association extends its sincere sympathy to his widow and son in their bereavement, and to express to them its high regard for the work and character of its fellow member, and be it further

Resolved, That a copy of these resolutions be spread on the minutes of this association, inserted in the *Dental Cosmos*, THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION and the *Bulletin of the Pennsylvania State Dental Society*, and a copy be sent to the members of his family.

HERMAN G. NAILOR,
RALPH E. BISHOP,
CHARLES J. SHANNON,
Committee.

A SPECIAL TOUR TO THE UNITED STATES

VISITING PHILADELPHIA DURING THE PERIOD OF THE SEVENTH INTERNATIONAL DENTAL CONGRESS, AUGUST 23-28, 1926

Organized by the American Express, Official Transportation Agents

TO PHILADELPHIA AND BEYOND

A Special Steamer and a Special Tour for Delegates to the Dental Congress

Arrangements for comfortable travel to New York and attendance at the Philadelphia Congress, followed by a short tour through one of the most interesting parts of America, have been completed by the American Express, through its travel organization in Europe and the United States.

The steamer selected is the Holland-America Line S.S. Noordam, of 22,000 tons, a liner whose former first and second class quarters now comprise one commodious cabin class. She sails outwards from Rotterdam, Boulogne and Southampton, and returns to Plymouth, Boulogne and Rotterdam after the Congress and the subsequent pleasure trip are over.

SEEING EASTERN AMERICA

The special delegates' tour visits seven of the largest cities in the United States and spends a day at its world-famous scenic center—Niagara Falls. A number of motor sight-seeing trips are included, and visits to the Dental Dispensaries at Rochester and Boston are events of particular interest. Traveling comfort is assured by the provision of superior hotel and sleeping-car accommodation throughout. The whole journey from New York back to New York covers 16 days in the United States, including attendance at the Philadelphia Congress, visiting New York, Philadelphia, Washington, Pittsburgh, Chicago, Detroit, Niagara Falls and Boston accompanied by an experienced tour director, practically all expenses being embraced by the moderate inclusive price.

ITINERARY OF THE TOUR

Aug. 10.—S.S. Noordam leaves Rotterdam and calls at Boulogne-sur-mer.

Aug. 11.—Sails from Southampton.

Aug. 20.—Arrive in New York.

Aug. 21 and 22.—In New York. Accommodation at Waldorf-Astoria. Half-day motor sightseeing trip of Greater New York. Yacht trip around Manhattan Island. Leave New York early afternoon, arrive Philadelphia two hours later.

Aug. 23 to 27.—At Philadelphia for the Dental Congress. Accommodation at the Hotel Bellevue-Stratford. Leave Philadelphia at midnight on the 27th.

Aug. 28.—Arrive Washington early morning. (Passengers may remain in sleeping car.) Headquarters, New Willard Hotel. Excursions by motor will be provided, visiting the important Government Buildings, Mt. Vernon and Alexandria, Va., Arlington and the Zoological Park. Leave Washington in the evening.

Aug. 29.—Arrive Pittsburgh morning. Headquarters, William Penn Hotel. Motor sightseeing trip to points of interest. Leave Pittsburgh midnight.

Aug. 30.—Arrive Chicago morning. No set program. Accommodation at Congress Hotel.

Aug. 31.—At Chicago. Motor sightseeing tour of the city including the Park and Boulevard system and the North Shore (Lake Michigan). Leave Chicago midnight.

Sept. 1.—Arrive Detroit about 8:30 a. m. Headquarters, Statler Hotel. Three hour motor trip through city and to Belle Isle. Visit the famous Ford Motor Factory. Passengers board sleepers at their own convenience, and

Sept. 2.—Leave Detroit about 3 a. m., arriving Niagara Falls 8 o'clock a. m. Excursion by electric tram around the Niagara Gorge. Voyage on the "Maid of the Mist" to the foot of the Falls. Leave Niagara Falls noon, arriving Rochester two-and-a-half hours later. Visit the Rochester Dental Dispensary. Leave by evening train for Boston.

Sept. 3.—Arrive Boston early morning. Headquarters Copley-Plaza Hotel. Visit Forsyth Dental Dispensary. Motor sightseeing trip through Old Boston, to Bunker Hill, through Residential Boston and to Cambridge. Leave Boston midnight.

Sept. 4.—Leave New York at 11 a. m. by S.S. Noordam.

Sept. 13.—Steamer calls at Plymouth.

Sept. 14.—Steamer calls at Boulogne-sur-mer and arrives at Rotterdam.

REGISTRATION

A deposit of £5 is required to secure definite reservations, and the amount is returnable in full at any time up to 30 days before sailing date. It will be refunded after that time if the amount deposited for steamship space can be recovered. Application for membership in this tour may be made through any American Express Office in Europe (see list). Ocean steamship accommodation will be assigned in order of application.

AMERICAN EXPRESS OFFICES

at which reservations for the Special Tour to United States can be made, and to one of which the application blank printed on page 907 should be addressed are as follows:

EUROPE

Great Britain

London	6 Haymarket, S.W.I.
Liverpool	31 James Street
Southampton	25 Oxford Street
Glasgow	115 Hope Street
Edinburgh	45 Princess Street

France

Paris	11 Rue Scribe
Havre	2 Place Jules Ferry
Marseilles	24 Rue Cannebiére
Nice	2 Rue du Congrés

Switzerland

Lucerne	4 Haldenstrasse
Zurich	79 Bahnhofstrasse

Belgium

Antwerp	87 Place de Meir
Brussels	121 Blvd. Adolphe Max

Italy

Rome	Piazza di Spagna
Naples	Piazza dei Martiri
Genoa	17 Piazza Nunziata
Florence	2 & 4 Via Tornabuoni

Germany

Berlin	55 Charlottenstrasse
Hamburg	9 Alsterdamm
Bremen	32 Bahnhofstrasse

Holland

Amsterdam	88/90 Rokin
Rotterdam	26a Zuidblaak

Denmark

Copenhagen	8 Holmens Kanal

Near East

Athens	31 Stadium Street
Piraeus	44 Philonos Street
Constantinople	15 Rue Voivoda, Galata
Jerusalem	Jaffa Road
Cairo	Continental Savoy Bldgs.

United States

New York	65 Broadway

Other offices in principal cities visited during the Special Tour and elsewhere throughout the country.

Inclusive Price of the Special Tour to the United States described £111, providing:

STEAMSHIP ACCOMMODATION.—Cabin-class steamship accommodation from Rotterdam, Boulogne or Southampton to New York and return to Plymouth, Boulogne or Rotterdam, amount of £57 12s. allowed. (For those who desire such facilities, rooms with private bath or other superior accommodations will be provided, the supplement being payable when final settlement for tour is made.

RAIL TRAVEL WITH PULLMAN (Sleeping Car) ACCOMMODATION.—First-class rail ticket covering the complete journey from New York back to New York. Sleeping car accommodation according to the rate paid.

HOTEL ACCOMMODATION.—Room without bath in New York, Philadelphia and Chicago. At other points sleeping cars will be used for lodging. Room without bath will be furnished

for use during the day while at Washington, Pittsburgh, Detroit and Boston. (For those who require hotel accommodation with private bath, the additional cost will be $1.00 and up per day per person, according to the hotel and accommodation occupied. All meals are included at hotels and on trains, commencing with lunch at New York, August 20th, terminating with breakfast at New York, September 4th. Several dinners will be tendered the delegates by local Dental organizations—the cost of these meals has been omitted from the price of the tour.)

SIGHTSEEING AND TRANSFERS.—All expenses in connection with sightseeing programmes as specified; also transfer of passengers and baggage between railroad stations and hotels.

BAGGAGE.—Free rail transportation of 150 lbs. of baggage; excess weight will be charged for at regular excess rates.

GENERAL INFORMATION

OPTIONAL ARRANGEMENT.—The Delegates joining and leaving the tour at New York will be entitled to a reduction of £57 12s. A further reduction of £3 will be granted to Delegates joining the party on arrival at Philadelphia.

EXTRAS.—Fees for incidental services of waiters, chambermaids, stewards on steamers, steamer chairs and rugs, cost of conveyances or other facilities not ordered by the tour manager, and such personal items as laundry, valet service, mineral waters, etc., are not included in the price of the tour.

FINAL PAYMENT is due June 15, 1926.

PASSPORTS are absolutely necessary. The American Express will advise you regarding passport application and assist in obtaining the necessary visas.

THE ITINERARY is offered in good faith and will be followed as closely as possible. The right is reserved, however, to make such changes as may prove necessary or advantageous for the group. Should curtailment of the land portion of the itinerary result, a refund will be made. In the event that the return sailing date should be delayed, any extra cost must be met by the passenger.

MAIL may be addressed to members of the Tour care of American Express Company Offices in the following cities: New York, Philadelphia, Washington, Pittsburgh, Chicago, Detroit and Boston.

RESPONSIBILITY.—The American Express Company, Inc., act only as agents, and accept no responsibility in connection with the service of any steamer, train, automobile, carriage or other conveyance which is used either wholly or in part in the execution of the tour, and they assume no responsibility for delay, accident or loss to personal property, or for additional expense due to war, storm, epidemic, delay or other cause beyond their control. They assume no responsibility for baggage, but the management will direct the shipment of baggage from place to place "at the owner's risk," and in the unlikely event of damage, delay or loss, will do all reasonably within their power to lessen the hardship incurred.

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7th International Dental Congress. Special Tour to the United States.

Fill out and return this form to nearest American Express office.

.....192.....

AMERICAN EXPRESS TRAVEL DEPARTMENT

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Please register my application for membership in the Special Tour to the United States. I enclose deposit equivalent to £5 which is made on the distinct understanding that it is returnable in full, if cancellation becomes necessary at any time up to 30 days prior to sailing date. Final payment is due on June 15, 1926.

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